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of

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TRANSACTIONS

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OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1882.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1882.

Massachusetts Horticultural Society.

List of Duplicate Books.

The following list comprises such duplicates of books in the Library as are for sale or exchange. Persons desiring any of them will please address "Librarian Massachusetts Horticultural Society, Horticultural Hall, Boston."

Acta Horti Petropolitana. Vols. 1, 2, and 3. 8vo. unbound. [In the Russian language.]

Allen, John Fisk. A Practical Treatise on the Culture and Treatment of the Grape Vine. 2d ed. enlarged. 8vo. wood-cuts. half calf. Boston, 1848.

Anderson, Thomas. On Sphærocoma, a new genus of Caryophylleæ. 8vo. pamphlet. 1 plate.

Annales de Pomologie, Belge et Étrangère. Vol. 1, 1853. Folio. 48 colored plates. half morocco. Brussels, 1853.

Aublet. Histoire des Plantes de la Guiane Françoise. 4 vols. 4to. 392 plates. half Russia. London and Paris, 1775. (8 plates wanting.)

Bancroft, George. Memorial Address on the Life and Character of Abraham Lincoln, Washington, Feb. 12, 1866. 8vo. portrait. cloth. Washington, 1869.

Bateman, James, F.R.S., F.L.S., etc. A Monograph of Odontoglossum. Folio. 30 colored plates. complete in six parts. unbound. London, 1874. Also another copy of part 4.

Bentham, George. Review of the Order of Hydrophylleæ. pp. 267–282.

— On Heliamphora nutans. pp. 429–433. 1 plate.

— On African Anonaceæ. pp. 463-480. 4 plates.

[The last three are 4to pamphlets, from the Transactions of the Linnean Society.]

Berlese, L'Abbé. Monographie du Genre Camellia, etc. 2d ed. 8vo. half calf. Paris, 1840.

Blume, C. L. Flora Javæ. Orchidées de l'Archipel Indien et de Japon. Folio. 66 plates. half green morocco. Amsterdam, 1858.

Bossin, L. Les Plantes Bulbeuses. 12mo. 2 vols. in 1. half green morocco. Paris, 1872.

Braun, A. Translated by Dr. George Engelmann. North American species of the Genus Equiseta. Notice of the Charæ of North America, by Braun and Engelmann. Mr. Geyer's Plants of Illinois, by Dr. Engelmann. 8vo. pamphlet.

Bravy. Culture des Arbres Fruitiers. 2d ed. 12mo. half calf. Paris.

Brincklé, William D. The American Pomologist. Fruits of American Origin. Vol. 1. No. 1. 4to. 10 colored plates.

Buel, Jesse. The Farmer's Companion. 12mo. cloth. Boston, 1840.

Burr, Fearing. The Field and Garden Vegetables of America. 8vo. many wood-cuts. cloth. Boston, 1863.

Candolle, A. P. De. Memoire sur les Mélastomacées. 4to. pamphlet. 10 plates.

— Memoire sur les Onagraires. 4to. pamphlet. 6 plates.

Cobb, J. H. Manual of the Mulberry Tree and Culture of Silk. 12mo. boards. Boston, 1833.

Colman, Henry. European Agriculture. 2 vols. 8vo. 5 plates. half calf. Boston, 1846.

Edwards, S. Botanical Register, 1838–47. 10 vols. 8 vo. green cloth. 688 colored plates.

Emerson, George B. Report on the Trees and Shrubs growing naturally in the Forests of Massachusetts. 8vo. 17 plates. boards. Boston, 1846.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1882.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1882.

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The Committee on Publication and Discussion take this opportunity to repeat what they have heretofore stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the papers and discussions now or before published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly. The award of a prize or gratuity for an Essay is not to be understood as implying that the Committee approve it in every particular, but only that they believe it calculated, *on the whole*, to promote the science or art of Horticulture.

BENJAMIN G. SMITH, *Chairman.*

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 7, 1882.

A duly notified stated meeting was holden at 11 o'clock, President Hayes in the chair.

The President delivered his annual address, as follows: —

ADDRESS OF PRESIDENT HAYES.

Ladies and Gentlemen of the Massachusetts Horticultural Society: —

From our different vocations in life we come to this meeting, drawn together by a common interest in the charming and instructive pursuit of horticulture. We feel that it is both pleasant and advantageous to study the developments of nature; that it elevates the intellectual, moral, and religious character of man to do so; that by association as members of this Society our work is much lightened and our progress made more rapid and sure; that each one is benefited by the experience of his associates; and that, being, from our tastes, in close sympathy, we are cultivating friendly relations with each other, thereby rendering our intercourse the more improving, and life more agreeable. At this opening of the year let me extend to you the most cordial greeting, and best wishes for your continued prosperity and happiness.

In looking upon the work of the Society for the past year we

can see that it has made important progress. Our discussions and discourses upon horticultural topics, and our beautiful exhibitions of flowers, fruits, and vegetables, have never been more interesting than during this period, and we are conscious that there is a growing taste for our loved pursuit in this community. It is extending throughout our whole land. In the autumn we received as our guests the members of the American Pomological Society, which has had at its head, for more than a generation, an honored and venerable ex-president of our Society. It was gratifying to us that it was universally admitted by our guests, from the different sections of the country, that our institution had exerted a most important influence in the foundation, establishment, and growth of the American Pomological Society, which ranks among the first, if it is not the first, of the Pomological Societies of the world. We had the pleasure of welcoming in these guests, gentlemen who are distinguished horticulturists, and well known as such both at home and abroad. We are pleased to know that the exhibition our Society made, and the hospitalities extended by us, on this occasion, were creditable to our Society, and were appreciated by our visitors.

During the past year the Executive and Finance Committees have carried out your wishes in respect to altering, repairing, and improving our building. I am happy to report that the entire cost attending this work, amounting to about five thousand dollars, has been paid without adding to the debt of this institution. We have now put in good repair, and improved in many respects, our halls, besides tastefully decorating them, so that now no halls in the city are superior to ours in convenience and beauty. By doing this we have augmented our financial ability, as, without these repairs, we could not let our halls at remunerative prices, competing, as we are now obliged to do, with other proprietors of similar accommodations. We cannot expect in future so large a revenue from our halls as we received when there were not so many in our vicinity competing with us.

By the repairs which have been made, and by the new arrangements of our business, our library is now an attractive room, well adapted to our wants, and a quiet and agreeable resort for all who wish to use it. Those who frequent it are now no longer inter-

rupted by the noise and confusion attending the business operations of the Society, or by the occupants of the halls, who, not having had, as they do now, a private office for their use, were obliged to transact much of their business in our library room, to the great annoyance of those who were pursuing in it their horticultural investigations. Convenient offices have been arranged for the Treasurer and Superintendent of the building and for the tenants of the halls, outside the library rooms. Other important improvements have been made in the building for the comfort and convenience of the members of the Society and our tenants.

The Society having thus provided for its immediate wants, I invite your coöperation in the further improvement and enlargement of the business accommodations of the building, especially that portion below the halls, by which the revenue of the Society may be largely increased without any expenditure of the Society's funds. This can only be done through the labors and liberality of our members, and others interested in our work, and I trust that some means may be procured and methods devised for permanent improvements, which will add several thousands of dollars annually to our income, and increase the value and architectural beauty of our structure.

The financial affairs of our Society and the care of our building have been since May last faithfully attended to by our present Treasurer, Mr. Fowle. As usual heretofore, the Treasurer is obliged to defer his report to the next meeting, the returns from the Mount Auburn Cemetery Corporation not being received in season to allow him to make up his accounts for presentation at this meeting. I learn, however, that we shall receive an income of about twenty-two hundred dollars from Mount Auburn on account of the last year's operations, being about one thousand dollars less than the previous year. It is to be hoped that we may receive a larger income in future years from this source.

We shall show, after paying the large amounts we have expended for repairs and improvements of the building, both outside and inside, and the charges attending the care and administration of our property, as well as all other claims against the Society, that we had at the commencement of this year a balance of

between eight and nine hundred dollars in cash in our treasury. To this will be added what we shall receive from Mount Auburn and other sources of revenue, so that we shall have sufficient, probably, to meet the wants of the Society for the coming year without making any increase of our debt. We are, however, much cramped in our proper work for want of means, and I trust measures will be adopted which shall furnish the additional income so much needed by the Society.

I cannot speak too highly of the efficiency of your Committees during the past year. The Committee of Arrangements have devoted much time to make our exhibitions what they should be and have been — a credit to the Society; and especially was the success of the festival given in honor of the American Pomological Society largely promoted by this Committee. The Garden, Floral, Fruit, and Vegetable Committees have admirably done their work, as their excellent reports fully demonstrate. The great interest which has been excited by the Society's discussions and the essays read at our meetings is mainly owing to the judicious and able management of the Committee on Discussions. We are much indebted to the Library Committee for selecting with care and wisdom the sterling works to be found upon our shelves, and I feel that perhaps we have not duly appreciated how much has been done by former as well as the present members of this Committee in so intelligently and faithfully discharging their trust as they have, by which the Society not only has been well supplied with what was required for the daily and immediate wants of a practical, working horticultural library and reading-room, but, by a wise appropriation of a portion of its income, costly works of great permanent value have been obtained, so that students of horticulture can find in our rooms the rarest and choicest works needed by them in their investigations, which cannot be found elsewhere in this country.

We are fortunate in having in our Secretary and Librarian a gentleman devoted to horticulture, who discharges his duties in a most satisfactory manner. Though he has already done much, yet there are many more things to be performed, especially in cataloguing the treasures of the library; and no one feels the necessity of this work more than himself. It is to be hoped that

as he has completed the History of the Society, and been able to bring up the publication of its Transactions nearly to the present date, he will find time during the coming year to devise and carry into execution measures for better opening to all, the literary and scientific acquisitions of the Society which are under his charge.

It is of great importance that the Society should husband its means, and have its revenue expended with discretion; otherwise we cannot accomplish what we should to promote in the best manner its objects. To this end it is desirable that the committees, in awarding prizes and gratuities, should strictly adhere to the Society's rules, and give nothing except for that which is really meritorious. If what is presented for a prize is not superior in itself, it should receive no recognition, though it may be the best specimen exhibited. A high standard of excellence should be reached by the exhibitor; otherwise the rewards of the Society should be withheld. In this way only can the funds entrusted to the committees be judiciously expended.

A marked feature of the exhibition for the year just closed was the Rose Show, which never was surpassed in the exhibitions of our Society. Though the season was not propitious for many of the growers of this lovely flower, yet, in consequence of the great competition, the best efforts of all were called out, and the result was that most beautiful collections were presented on our tables.

The surpassing excellence of this exhibition was, in a great measure, owing to the stimulus of special prizes of silver cups being offered, the cost of which was defrayed by subscriptions of several of our members. Other special prizes were offered by the generous friends of the Society; and it is to be hoped that such prizes may be continued this year, not only for roses, but for many other specialties of horticulture.

Ladies and Gentlemen: In the retrospect of the year, while we are pleased to mark the progress of the Society in its career of usefulness, yet it never was more evident than now that it demands of its members their constant efforts to forward its interests. Its standard and aims are high, and ever continuing advancement in the art and science of horticulture is expected of it. We must have an increase of income to meet the Society's proper demands. We cannot ask a few persons to supply our wants, but we must unit-

ed work to accomplish the desired object. Each one can do something; if not by contributions of money, he can give his intelligence, influence, and time to accomplish the object, and assist and sustain those who are endeavoring to help the Society by a watchful care of its interests. We must all coöperate to improve the condition of the Society, as the means and strength are given us; and, while grateful for what has been done in the past, we must not rest satisfied with what has been achieved, but push forward in our work, diligently and fearlessly, and ever with prudence, having no private ends to gain, nor personal wishes to gratify; but at heart always and only the promotion of the welfare and extended usefulness of the Society.

On motion of C. M. Hovey, the thanks of the Society were unanimously presented to the President for his interesting address, and a copy was requested for publication.

On motion of Mr. Hovey, it was

Voted, That the Executive and Finance Committees, together, be a Committee to carry out the improvements in the Society's building referred to in the President's address.

The President read a letter from Dr. E. Lewis Sturtevant, resigning his position on the Committee on Publication and Discussion, as he had been elected Director of the New York State Agricultural Experiment Station.

John B. Moore, a member of the Committee, and William C. Strong, the former Chairman, expressed their high estimation of the services of Dr. Sturtevant, and their regret at losing him from the Committee; and, on their motion, the thanks of the Society were unanimously presented to Dr. Sturtevant for his able and valuable services on the Committee on Publication and Discussion and elsewhere.

On motion of E. W. Wood, seconded by William C. Strong, William H. Hunt, of Concord, was unanimously chosen to fill the vacancy caused by the resignation of Dr. Sturtevant.

The following appropriations, recommended by the Executive Committee at the meeting on the 5th of November, 1881, and then laid over to this meeting, were taken up, and unanimously passed: —

For Prizes	$3,050 00
For the Library Committee, for the purchase of magazines and newspapers, binding of books, and incidental expenses of the Committee . . .	$200 00
For the Committee on Publication and Discussion .	$150 00
For the expenses of the Committee of Arrangements	$250 00

The President announced that the Executive Committee had appointed George W. Fowle, Treasurer of the Society and Superintendent of the Building, and Robert Manning, Secretary and Librarian.

John O. Sargent, of Lenox, and
Mrs. Maria West, of Dorchester.

having been recommended by the Executive Committee, were on ballot duly elected Life Members of the Society.

Adjourned to Saturday, January 14.

MEETING FOR DISCUSSION.

Ornamental Arboriculture.

Charles M. Hovey wished to make a few remarks on the general subject. It is much deeper than the mention of particular trees. He admired the enthusiasm of the essayist on this subject,[1] but thought that he had not read up upon the subject, consulted good authorities, or given sufficient credit to the pioneers of horticulture in this State for their attention to arboriculture. Mr. Hovey quoted, from the published abstract of Professor Robinson's paper, some statements which he thought needed a reply, and said John Lowell wrote, in 1817, an article on native trees similar to Professor Robinson's, and seventeen years later the speaker visited Mr. Lowell's grounds, and saw the fine specimens of native forest trees which he had planted. General Dearborn wrote on the subject in the "New England Farmer," year after year, and sowed

[1] See Transactions, Part II., 1881, page 155.

the seeds of rock maples at his grounds in Roxbury; and some of the trees raised from these seeds he transplanted to Mount Auburn, soon after that cemetery was established by this Society, where they are now among the most beautiful ornaments of the place. The trees planted by Governor Gore, at Waltham, are still standing. About 1750 Ralph Inman planted an avenue of American elms, leading to his residence in Cambridge, and four European lindens, two of which, nearly a hundred feet high, and a horse-chestnut tree, planted about the same time, are still standing. There are horse-chestnuts on Brattle street, in Cambridge, from a hundred to a hundred and fifty years old, in fine condition. The Massachusetts Society for Promoting Agriculture (formed in 1792) offered prizes for the best plantations of forest trees. Although much was done at Philadelphia in this direction by John Bartram, William Hamilton, and others, a great deal more was done on the sterile soils of this State. The trees planted were nearly all American, and mostly elms and rock maples. The foreign trees were confined to a few limes, horse-chestnuts, English elms, and Norway maples. In later years, not so many native trees were planted. The pioneers of horticulture here were men of broad views, and interested not only in the cultivation of fruits and flowers, but in arboriculture, and they did everything they could to extend it.

Mr. Hovey thought that Professor Robinson had not given nurserymen sufficient credit for what they have done to promote arboriculture. Early in the present century Prince's nursery at Flushing, Long Island, contained almost every native and foreign tree then known, and they were soon after introduced here by Kenrick and Winship. Parmentier, whom the essayist alluded to as having done so much, came to this country about 1820. The speaker introduced the silver maple into this vicinity. In his view nurserymen have done a great deal for arboriculture. Lists of new trees are suggestive; but it will not do to urge planting them generally, without some experience. Many trees from Japan have proved hardy, but others have not, and we shall know better about them after the test of a severe winter. In 1843 there were not a hundred rhododendrons around Boston except the native *Rhododendron maximum;* soon after that time the speaker

first introduced them, and began to direct attention in the "Magazine of Horticulture," which he then edited, to the importance of planting these beautiful shrubs, and the result is seen in the grounds of Mr. Hunnewell, President Hayes, and others, to-day.

Mrs. C. N. S. Horner spoke of the common chestnut as succeeding under cultivation. She knew several instances where they had been successfully transplanted from the woods. It grows rapidly. An avenue of chestnuts on one side, and locusts on the other, was planted in Georgetown, in 1735, by the first clergyman of the place. One of the chestnuts, now standing, measures thirteen feet and ten inches in circumference at the smallest point of the trunk, and though broken by storms is still stately.

Aaron D. Capen mentioned a case where one of the most valuable elms in Dorchester was destroyed because a street happened to come within six feet of it. The street was opened on condition that the tree should be preserved; but the next proprietor destroyed it. Mr. Capen also spoke of the deplorable manner in which trees are hacked and mutilated by unskilful persons, who call it pruning; but it is rather butchering. There is on a hill-side in Dorchester a white oak eighteen feet in circumference at the ground and fourteen feet and nine inches at four feet from the ground. A limb sixty feet long, and containing a cord of wood, was blown from it a few years ago. There are in the same town two other fine oaks, for the safety of which he trembles; they are all pasture oaks. The influence of this Society should be exerted to save such trees from destruction.

Warren H. Manning had noticed that the Scotch elms in the nursery rows are not troubled by canker-worms, while the English and American elms in the same rows are. The European linden is eaten by borers here, but not in its native country, while the American linden is free from them here. He thought that, as a general rule, native trees are less troubled by insects here than foreign species, and that insect enemies have more to do with their failure here than the influence of climate.

William C. Strong was surprised to hear how much could be said of arboriculture in this country in former days, and he agreed with Mr. Hovey, that it is greatly to the credit of early horticulturists that so much was done. Yet Professor Robinson's position

that we are still in the infancy of arboriculture remains true. One who goes to Europe will think this is a great country, with great capacities, yet to be developed.

Mr. Strong did not agree with Professor Robinson's commendation of the rock maple; but thought it was planted too much. He placed the American elm at the head of all avenue trees. The rock maple is too dense, while the elm has the right degree of density, and arches gracefully over the highways. He wished to emphasize the value of the black walnut, which is not surpassed by any tree on the list. The finest one he ever knew was in Newton, and was blown over by a gale. It is not a popular tree; its form is not such as to commend it in autumn or winter. Alluding to Professor Robinson's opinion, that foreign trees are not generally adapted to our soils, Mr. Strong mentioned one exception, — the Norway maple; and said that no tree is more desirable for cultivation here. It does not grow so straight when young as the rock maple, but thrives better under neglect, or in grass. There are two or three types; the Scheidweiler's, or purple, is richer than the purple beech, and instead of changing to a dull green late in the season like that, it takes a fine dark green. Reitenbach's is not so fine in spring; it comes out variegated and changes to very rich dark purple in the autumn. It is new and the specimens are not large, but it promises well.

Rev. A. B. Muzzey thought Mr. Hovey's view correct, that more was done in arboriculture in former days than is generally supposed. Nurserymen have attempted to introduce new varieties of trees, but the public taste has not sustained them. Compared with the interest felt when he was young, he thought there is now less taste for tree culture and less regard for old trees, which he attributed to a general decay of veneration. This marked tendency to a decline in reverence he regarded as a great defect in individual or national character. What can be more improving to a family than to have beautiful trees to look upon? He had lived to see many beautiful trees cut down ruthlessly, and he thought the Society should form a solid opposition to such destructive acts; and he asked whether it could not, by lectures or otherwise, do something practical to create a better feeling. In his view arboricide should be ranked with other crimes.

Hon. Marshall P. Wilder spoke of the tendency to run after new things, and said that while giving all honor to those who are seeking to introduce new and beautiful trees, we should not forget the pioneers in arboriculture, or the principles instilled by Dearborn, Lowell, and Preble. They corresponded with François André Michaux, the author of the "North American Sylva," and this led to his bequest to the Massachusetts Society for Promoting Agriculture, for the encouragement of the growth of American trees and shrubs. They were in advance of their time, and had written on arboriculture, and hence the planting of Lyman and Gore at Waltham (all American trees except a few European elms and limes), instanced by Downing as examples of estates in the modern English style. Nathaniel Amory, in 1800, and Eben Preble, in 1808, on the estate afterwards owned by John P. Cushing, and now by Samuel R. Payson, planted trees on the principles of modern landscape gardening. Afterwards there was an interval which might have led Professor Robinson to suppose that arboriculture was neglected; but it was one of the first things to be attended to. The Hon. James Arnold, of New Bedford, was practically interested in arboriculture and landscape gardening, and hence his bequest for the promotion of arboriculture, which he entrusted to George B. Emerson, who applied it to the establishment of the Arnold Arboretum.

William H. Hunt spoke of a magnificent elm which forms one of the chief features of the landscape near his house, in Concord. Its height is eighty-eight feet, and spread one hundred and twenty-five feet; the circumference at a foot from the ground twenty-five feet, and at the smallest part of the trunk sixteen feet. The branches are most extraordinary; at fifteen or sixteen feet from the ground one measures eleven feet, one ten feet eight inches, one nine feet, and one eight feet in circumference, and they hold this size remarkably.

Mr. Hunt thought there is a great opening for officers of railroads to do something to cultivate a taste for trees. Much can be done in this direction at small expense. In Europe there are delightful gardens at the railroad stations, and at many of the hotels, where it is desired to preserve a view and not to cut off shade, trees are trained and kept at a height of about fifteen feet.

George Hill spoke of the white oaks in the Waverly district in Belmont, near the Waverly depot, which Professor Agassiz said were the largest in the United States. One of them is twenty-five feet in circumference, and eight feet of the trunk would make two cords of wood. Another, which was nearly a hundred feet high, and had been burnt inside, and has since fallen over, had a hollow so large that Mr. Hill got into it before it had fallen, and could lie down without touching either side.

Leander Wetherell expressed his gratification with the remarks of Messrs. Wilder, Hovey, and Muzzey. He thought there is now less general interest in arboriculture than there was years ago. He spoke of his first visit to Northampton and Pittsfield, and the delight he felt on seeing the truly magnificent elm trees. Jenny Lind, while living at Northampton, rode daily to Hatfield to worship under the elms planted by a former generation. There is also a fine avenue of trees at Col. Russell's "Home Farm," in Milton. No generation has done more in arboriculture than our grandfathers, and the present generation has reason to be ashamed that it has done so little. The first settlers were necessarily engaged in planting for a subsistence, but they did enough in tree planting to make themselves remembered. We are apt to magnify our own doings, and forget what has been done by our ancestors.

President Hayes spoke of the gigantic trees which he had seen in California, one of which was so large that he and seven other persons rode into the hollow of its trunk. He had heard of the crime of arboricide, and agreed with Mr. Muzzey that it deserves punishment. He spoke of the interesting notices and measurements, by Mr. Emerson, in his Report on the Trees of Massachusetts, of many of the larger trees in this State, and suggested the appointment by the Society of a committee to make a list of the trees in New England remarkable for their size or beauty. Information in regard to such trees could be procured from agricultural societies and from individuals interested, by correspondence.

John B. Moore moved that a committee of three be appointed to ascertain the size and location of large or otherwise interesting trees. The motion was carried, and the Chair appointed as that Committee Rev. A. B. Muzzey, Edward Hersey, and E. H. Hitchings.

E. H. Hitchings spoke of an elm tree at Lancaster as the finest known to him. At three or four feet from the ground it measures twenty-eight feet in circumference.

The President gave notice that on the next Saturday there would be a discussion on "The Best Method of Cultivating Pears and Apples;" to be opened by William C. Strong, and continued by Marshall P. Wilder and E. W. Wood.

BUSINESS MEETING.

SATURDAY, January 14, 1882.

An adjourned meeting of the Society was holden at 11 o'clock. President Hayes in the chair. No business being brought before the meeting, it

Adjourned to Saturday, January 21.

MEETING FOR DISCUSSION.

This was opened by the reading of the following paper:—

APPLE AND PEAR CULTURE.

By WILLIAM C. STRONG, Newton Highlands.

In compliance with the request of your Committee to open the discussion of so broad a theme as the Culture of the Apple and Pear, I shall feel at liberty to leave the methods of culture to those who may follow, and who have had an extended experience, while I confine myself to a few general observations relating to the subject. The similarity between these, our two largest and most important fruits, would naturally incline us to make comparisons as to their relative merits. Yet, though they belong to the same genus, and though certain varieties of each species approximate to a close resemblance with the other species, they still retain their distinct characteristics, their uses remain

distinct, and it is scarcely fair to draw a comparison between the two. The quality of some of our best varieties of the pear in their natural state is so delicious that, in the opinion of most, the apple could not be placed in comparison in this respect. Even the Gravenstein, Hubbardston Nonsuch, and Northern Spy would be neglected, if in the same dish with the Seckel, the Doyenne du Comice, and the Easter Beurre. The price of dessert varieties of the pear is decidedly in advance of that of the apple. It is not an overstatement to say that marketable varieties of pears will sell for from two, to three and four, or even six times as much per bushel, as corresponding kind of apples.

Then, again, the apple is slow in coming into bearing — it is a long investment, and our cultivators are impatient for quick returns. The tree is homely, and of too coarse growth for small lots, in the vicinity of large cities; it is often infested with canker-worms and caterpillars, and the fruit itself is very liable to be ruined by insects. The pear, on the other hand, is comparatively free from such pests. With the exception of blight (concerning which we may not yet form definite opinions) it has no serious disease, and we expect, with a good degree of certainty, that judicious culture will insure a uniformly fair crop. It is, therefore, a natural result, that the pear is to a great degree superseding the apple among cultivators in the vicinity of Boston. In my own experience, as a dealer in trees, I should say that the demand for pear trees, in this immediate vicinity, is as twenty to one for apple trees.

But it would be a very false conclusion to infer from these facts that the pear is of more intrinsic value, or indeed more profitable for general cultivation, than the apple. On the contrary we believe that the apple, though not attaining to the highest excellence as a delicious dessert fruit, is, nevertheless, the most important and valuable of all our fruits. We have only to consider its perfect adaptation to our soil and climate, the ease and permanence of its production, its keeping and shipping qualities, and its paramount excellence as a cheap and health-giving food, to admit that it is, indeed, the most indispensable fruit in the list. How, then, does it happen that apple culture has so declined in this vicinity, whilst pear planting is continually extending? We have

alluded to the local reasons, such as the suitableness of the pear for small lots, its health and cleanliness and early productiveness, commending it to the favor of suburban residents. And as it is essentially a dessert fruit, comparatively transient when in condition for eating, it is the more desirable that it should be a home product. Apples, on the contrary, can be kept, stored, and shipped with comparative safety, and hence can always be bought at moderate rates; so low, indeed, that it seems cheaper to buy a few barrels as wanted than to hire help to care for the amount required for a family supply. Then, again, the apple is so slow in coming into bearing that we are hoping our spare land will be wanted for house-lots long before an apple orchard would be in its prime. But all these reasons are local, and do not touch the main question,— the profitableness of apple culture in Massachusetts. It is a fact which needs to be frequently repeated, that our State furnishes thousands of acres of hill-slopes capable of producing the very best results in apple culture to be found on this continent. Taking quality into account, we should say this is not too strong language. We seem to have the desired medium as to extremes of heat and cold, as to poverty and over-richness of soil, and the suitable dryness of air in autumn, to secure the highest excellence in the quality of this fruit. If we, then, admit that we have the facilities for producing this fruit, which is obviously a necessity in every family, so important that the supply is not likely to exceed the demand, it surely follows without saying that its culture must be profitable.

Why, then, is it that we see so few examples of thrifty young apple orchards upon our hill-sides? Why so many old orchards apparently going to decay? How did it happen that in our last year of plenty, in 1880, we were told that raising apples did not pay at one dollar per barrel, packing free? Surely, in the very nature of things, these questions can be answered. We can produce as *cheaply* as anybody, and as good as anybody, a fruit which everybody wants. Then it follows that it is our own fault if we do not produce it at a remunerating rate.

I apprehend that the great trouble is that our people want a quicker way to make a livelihood. No doubt the apple is the slowest of all our fruits to make fair returns. It requires consid-

erable capital to start an orchard, and wait long years for gradual returns. Quick annual returns, from the fertile fields at the West, are more attractive to the sons of our New England farmers. The young blood is drawn away, and the old homestead runs down. It is certainly true that the apple orchards of the State are far from being what they might be. There has not been that degree of attention paid to their culture that has been given to the pear, though the latter cannot claim equal importance. And Nature's very prodigality has been a prominent cause of this result.

How often do we hear it said that apples are so cheap it does not pay to raise them! Has it ever occurred to these objectors at how surprisingly low cost Nature has provided this fruit? There the tree stands, loaded almost to breaking, wide-spreading; you can stand under one tree and pick the fruit by the barrel. With such bountiful returns it ought to be your pride to produce the largest quantities at the minimum cost, with the spirit of our manufacturers, who are ready to compete with all the world.

In this case you have all the conditions for a successful enterprise. You have the very best climate without cost; you have most suitable land at a low cost; you are near to markets and a seaport; the amount of work and of hired labor involved is not proportionately large; you have a solid basis of value upon which to rely, and have ample time in which to meet all the requirements of the business.

It is your own fault if you do not make a steady and considerable gain in the course of years. But, we admit, the beginning of the enterprise is a wearisome process. You are inclined many times to ask if you shall live to see those small trees come into bearing. You think of the labor expended, and the interest rolling up, before you can receive a dollar in return; and when you see so many other ways opening which give promise of quick returns it is no wonder that you hesitate about choosing this.

It is time to consider whether the State should not extend a fostering hand to this industry; whether some equivalent to a protective tariff — some encouragement to orchard planting, like premiums for size of orchards and for culture, should be established.

There is present need of a new stimulus in apple raising. Hundreds of decaying farms need to be rescued. Our young men

should be encouraged to retain the homestead and invest in trees which will anchor them for life. Apple orcharding is a far more permanent and reliable investment than the cultivation of any other fruit. Hence the importance of attracting capital in this direction. There can be no doubt that the taxable value of our State could be materially increased if some policy were adopted to cover our hill-sides with apple orchards. With the increased facilities for shipment, there would be no danger of an over-supply of fruit. If the cost is reduced to a minimum there will be no limit to a remunerating demand. Consider, also, that our own population doubles every twenty-five years. It is high time the trees were started for our coming population of one hundred millions.

A few words as to varieties. Here we come upon a sore evil, and a great source of discouragement to progress in planting. It is bad enough to experiment with new candidates for favor among the small fruits; yet the trial lasts only for one season in the case of the strawberry, and you can plough your patch and stand waiting to be annually victimized with each succeeding wonder. But it is a long process in the case of the apple and the pear, and when once you have a variety it is awkward to make a change, and the chances are ten to one that it becomes a fixture. Thus the most ordinary kinds are perpetuated, generation after generation, occupying the place of their betters and dragging down the standard to their low level. What immense injury has been done to pear culture, for example, by the dissemination of second, and third, and fourth-rate kinds, which come to be only a vexation and a nuisance to the producer! What a revulsion of feeling must come to one who has watched the luxuriant growth of the Buffum pear, for example, when he finds himself loaded with a fruit which he is distressed to see rotting on his hands, though he would have gladly given it away if he could have found any one innocent enough to receive it! It is a serious misfortune that the satisfaction in fine varieties is so largely counterbalanced by the incubus of kinds which we cannot sell, but which we think are too good to throw away. And we are forced to admit that the nurserymen are answerable to a large extent for this state of things. For one I am disposed to plead guilty. "I do remember my faults this day." Doubtless I have contributed my share in swelling the list

of second-rate varieties, when an intelligent firmness might have persuaded my customers to "take only the best." But my resolve is to sin no more in this direction. I am persuaded that the multiplication of varieties of fruits is a decided evil, unless some peculiarity is developed which is clearly an advance. It is true we are profited by exhibitions of large collections of varieties, and we are thankful to those cultivators who can afford us the instruction derived from noting the descending shades of inferiority in the long list. Mr. President, I believe in infinite variety in ornamental plants. The infinite Creator has placed no limit to the diversity of his works, each having an individual excellence, peculiar to itself. In the culture of plants variety is an essential element of pleasure. The rose amateur, who notes the differing shades and forms in a collection of several hundred varieties, has an exquisite pleasure in studying the endless diversity of beauty. To cultivate and develop this diversity in trees and plants is legitimate and desirable.

But we test our fruits by a different standard; the proof with them, as with some other things, is in the eating. Taking this very practical test, in connection with the habits of the kinds, we may limit the amateur to a score of varieties of pears and half that number of apples. Most cultivators for market purposes would confine themselves to the Bartlett and Beurre d'Anjou for pears, and Gravenstein and Baldwin for apples. The objection to this narrow confinement is that the season of these fruits is not covered by these two varieties of each. We must add early, intermediate, and late kinds, to cover the nine months when these fruits are in perfection. But it is a noteworthy fact that experienced orchardists limit themselves to three or four, or, as an extreme, to six kinds. In my judgment it is quite time that this Society should assist the general, unsuspecting public in the same direction. We have offered prizes for long lists of kinds. Now let us publish the simple truth that there are but few kinds worthy of general culture. We shall find an appreciative and thankful audience, and may rest assured that we can thereby save them from a great amount of disappointment. In this connection, is it not a singularly noticeable fact that in many products of the soil the species has one leading variety at differing epochs, which for

its time stands out *facile princeps?* For example: we may at the present date name the Early Rose among potatoes, the Crawford's Early of peaches, the Bartlett of pears, the Baldwin of apples, and the Concord of grapes; though we may wince as we add this last, and will admit that we are not satisfied with some of the rest. Yet so the list stands today. All honor to every effort to obtain improved varieties. No one appreciates them more than I. Changes will come; we are in a fair way to displace the Concord grape, at least. Meantime we can do good service in the opposite direction by warning the public against the thousand and one commonplace kinds, which cannot satisfy. While we confidently look for advances and improvements in varieties, still we are not to forget that we have limited numbers of kinds of decided superiority, and that it is our duty to place these prominently in front, remembering the wise rule to "prove all things, and hold fast that which is good."

Discussion.

Hon. Marshall P. Wilder expressed admiration of Mr. Strong's desire to reduce the list of fruits while embracing all the excellences. It is what we have all been trying to do for many years. The speaker knew no other way to ascertain the most valuable fruits than to prove everything that comes up, and cast away what is not good. He had pursued this course until it had cost him twenty or thirty thousand dollars, and nine out of ten of the pears tested were not desirable. The late A. J. Downing remarked, nearly forty years ago, on the mania for pears in the vicinity of Boston. Every new variety was seized upon and tested as soon as heard of. As one result of this enthusiasm we have gained, along with many other valuable acquisitions, two fine pears, — the Bartlett and Beurre d'Anjou, which will grow wherever any pears will grow.

There is no difficulty in improving the apple, or in encouraging its culture. Within a few years there has grown up a great interest in the shipping of apples, and the exportation of pears will follow. New Hampshire, in 1880, sent 250,000 barrels of apples to this market. They can be grown at a profit on our hillsides, but not where land is worth twenty-five cents a square foot.

It is a singular fact that New England has produced the three best apples, taking all things into consideration, including shipping qualities, — the Baldwin, Rhode Island Greening, and Roxbury Russet.

Of all the apples exported from Boston, ninety per cent. are Baldwins. Red apples bring a higher price than green or yellow kinds. The Lady apple sells at a higher price in London than any other kind; but the demand is limited. The speaker thought that the cultivation of apples should be encouraged in every proper way, but he was not ready to say that he approved of the offer of premiums by the State. He had spoken rather disparagingly of the everlasting desire for new things, because much of it grows out of fashion, though this is less the case with fruits than with flowers. In our desire for new things we have passed by many very desirable fruits, among which is the Duc de Brabant pear, introduced forty years ago under the name of Merveille de Charneux. It makes a beautiful tree, and is a large and handsome fruit, excellent in all its characteristics, though perhaps a little too sweet. The pear sent out by the late Francis Dana as one of his seedlings, under the name of General Warren, has proved identical with this. Another neglected pear is the Emile d'Heyst, a variety of most extraordinary excellence in every way; named for a son of L. E. Berckmans. It makes a capital tree, which holds its foliage until frost. It bears in great clusters of sometimes as many as eleven pears, and must be thinned. It is one of the best pears introduced in the last half century. The Dr. Lentier pear is as large and beautiful as the Bartlett; it ripens in October and November, and has beautiful foliage, which remains dark green until frost. The Souvenir du Congrès was first exhibited at the World's Fair, at Paris, in 1867, where the speaker saw it. It is a seedling of the Bartlett, and ripens at the same time, but is free from the musky odor of its parent. It keeps sound at the core, and the tree is a vigorous grower.

Mr. Strong remarked that the tree suffers in winter.

Mr. Wilder said that he had had six or seven bushels of the fruit, and considered it a valuable acquisition, and that the tree was as hardy with him as any tree.

In regard to some American pears his experience differs from

that of some who have not had so much. Complaints are made that the Clapp's Favorite rots at the core; but he had found it keep as well as any other summer pear. They must be gathered early, — about the middle of August. In 1867 Mr. Clapp had gathered all his by the 20th of August, some of which the speaker carried to the meeting of the American Pomological Society at St. Louis, where they were tested by Dr. Thurber and others, on the 13th of September, and found sound. It is the largest and handsomest early pear, and, if picked early, is all that can be asked for.

There is a class of pears which it is very important to secure,— varieties which make large, robust trees. Among these is the Buffum, the value of which is not generally understood; but the speaker had found his trees more profitable than any other variety except Beurre d'Anjou and Merriam. One of them has borne twenty bushels in one season; last year it bore fourteen bushels. They must be picked early, and then they will color finely. Specimens thus treated were pronounced by the late A. J. Downing nearly equal to Seckels. The speaker has a Bartlett and a Buffum, of the same age, standing side by side, and the latter is two or three times the size of the former, and will bear fifteen bushels when the Bartlett will not give five. They bear as much as an apple tree, and generally every year; and the fruit when sent to market is just what the million want. The Beurre Hardy, Paradis d'Automne, and Doyenne Boussock, are all strong growers and abundant bearers. He has trees of all, twenty-five feet high. He picks a portion of his Doyenne Boussocks in August, so as to relieve the tree, and give it force to form fruit buds for the next year. The Paradis d'Automne is nearly as large and handsome as the Beurre Bosc. The Brandywine makes as large and fine a tree as the Buffum. The Harris, one of the Messrs. Clapp's seedlings, is scarcely excelled in quality. The Admiral Farragut and President, two of Dr. Shurtleff's seedlings, though not of the highest quality, are good enough, and the fruit is of large size, and they make excellent trees. Russet pears take the eye in the market, when well ripened. The Buffum is a little russety; the Brandywine, Harris, and Paradis d'Automne have more russet. The Merriam is a little russety; to develop its quality to the highest extent it must be picked early, but for market it may be left on the tree longer.

In concluding, Mr. Wilder advised all to sow the seeds of fruits in the hope of producing improved varieties; to keep on as long as they live, and to teach their children to follow their example, and future generations will bless them for it. Why, he asked, should we not raise another apple as productive and profitable as the Baldwin, with greater refinement and delicacy, or a pear as rich as the Dana's Hovey, but two or three times as large? John J. Thomas has remarked on the wide field open for the production by hybridizing of improved varieties of the pear, apple, currant, and gooseberry.

Leander Wetherell said that the Newtown Pippin brings a higher price in England than any other American apple, and asked why that variety is not grown in Massachusetts.

Mr. Wilder said that the Newtown Pippins are apt to be spotted and smutty; but, if good specimens can be produced, they bring as much as Lady apples.

E. W. Wood, Chairman of the Fruit Committee, was next called on, and said that, when asked to follow two such veterans as Mr. Strong and Mr. Wilder, he could only give his observations. We must divide growers into two classes: first, amateurs; and, second, those who grow to make money. The requirements of the former are very different from those of the latter. The amateur can indulge in all the varieties mentioned by Mr. Wilder; the grower for market must restrict himself. The late Josiah Stickney, Ex-President of this Society, who cultivated two thousand pear trees, told the speaker that if he were to plant a hundred pear trees for profit they should all be Bartletts. This variety grows quickly, bears young and regularly, and ripens at a time when you can drive your wagon into the orchard and fill it and drive to market. The Beurre d'Anjou and other winter pears must hang on the tree until the 10th or 15th of October, and if you have no regular fruit-room to keep them in they are a great deal of trouble. As Mr. Stickney said, "There is a great deal of detail in growing winter pears." It is no advantage to amateurs to have three or four trees of a kind; one tree will, when grown, supply all that an ordinary family will want of one variety; and it is very disagreeable to see fruit wasting. Dealers will recommend very few varieties. Until last year the speaker had classed the Clapp's Favorite among the

market pears, but last year the trees blighted more than any other variety.

Mr. Wilder said that while Mr. Clapp had lost nearly all his Clapp's Favorite trees, he had himself lost none of that variety.

Mr. Wood said that Messrs Clapp's experience was that of many others. The blight is the worst feature of pear growing, as a matter of business. He knew two or three pear orchards, of several acres each, that have been ruined by blight. Few Bartlett, Seckel, or Beurre d'Anjou trees are affected by blight; the Vicar of Winkfield, Beurre Bosc, and Clapp's Favorite are badly affected. We must select from the former class. The Bartlett fills the market in its season, and some growers get as much fruit as from any variety. It can be grown with less thinning than other varieties; but if one-third is picked early — before fully grown — they will bring as much as the main crop. Large growers average from one to three dollars per bushel for this variety; the latter price for the early ones. It is applicable to more uses than almost any other kind; it is one of the most valuable for canning: and the use of canned fruit has become almost universal. Ex-President Stickney said that the demand for Bartletts increases faster than the supply.

Among autumn pears, said Mr. Wood, Mr. Wilder has mentioned some of the older kinds; but newer ones are taking their places. The speaker could not recommend either the Buffum or Doyenne Boussock, for he could not get an average of over seventy-five cents per bushel for them, when Bartletts would average a dollar and seventy-five cents. The Beurre Bosc is one of the most profitable; last year they brought from two dollars and a half to two dollars and three-quarters per bushel. A ten-year-old tree bore four bushels. In dry seasons the leaves sometimes fall; but in moist ground it always does well. A lady who always showed fine Beurre Boscs used to have the leaves fall, but mulched and watered her trees, and then had no more trouble. The Dana's Hovey comes a little later; it is small, but that is the only objection to it. He would plant a proportion for market, for no other variety will command so high a price; they brought five dollars per bushel last year. No other pear of its season is of so fine quality for dessert. It bears in clusters, and it is considerable work to thin the crop; but this must be done, as with the Seckel, and if treated like the

Seckel it is just as valuable. The Duchesse d'Angouleme comes next in general estimation as a market pear; but the speaker could do nothing with it. The wants of standard and dwarf pears are entirely different, and to succeed with either it is necessary to know their wants. The quince tree grows naturally on river banks, and grafting it with the pear does not change its nature. On gravelly soils trees on quince roots endure but a few years; on strong soils they succeed and root from the callus, or if they do not they can be made to in every instance by puncturing the callus with a knife or gouge. In this way a perfect set of roots can be secured instead of a single large root on one side. The Duchesse as a standard would hardly bear for ten years, while dwarfs will bear young and produce all exhibition specimens. The Beurre d'Anjou comes next, and the speaker agreed with all that could be said in its praise. The Revere cultivators would recommend Beurre Clairgeau, which brings as high a price as the Beurre d'Anjou; but the market for it is limited. Nine-tenths of all that are sold go to hotels and restaurants, where they are preferred by the keepers — not by the guests — to pears of finer quality, because they last longer. A dish of this variety is as handsome as a bouquet.

The apple is the fruit of New England. The speaker believed that a change is going on in regard to the views taken of the profit of cultivating the apple, and that we shall see this fruit more prominent every year. When the President of the American Pomological Society stated, a few years ago, that the market for American apples was as firmly established in Europe as that for American wheat, few people recognized the fact; but, in 1880, 1,346,000 barrels were exported.

The apple is a farm product, and as a State Society we have a great interest in its cultivation. Massachusetts is most favorably situated of any of the States to satisfy the foreign demand, that is sure to increase. Apple trees are large and spreading, and take up too much land when it is as valuable as it is within ten miles from Boston; but where land is not worth over fifty dollars per acre they can be grown profitably. Mr. Wood thought Mr. Strong's paper was not sufficiently encouraging; he put the returns from planting apple orchards too far in the distance. Mr. Wood, if he had plenty of land, would set apple trees forty feet

apart, and plant between them three times as many peach trees, which would give a crop in three years, and die before the apple trees needed the room. We have reports of apple crops in eight years from the time of planting. It has not been the practice to give apple trees a fair chance. The land is not lost if you plant only apples, for crops of vegetables can be grown between the trees. Many farmers have set apple trees only along the margins of their fields, which is both ornamental and agreeable, and, while it does not injure the fields, gives better fruit than a solid orchard. The speaker mentioned an instance where a new road was made through an old orchard, and below the road the trees took a new start. With little effort we can get more apples and money from our orchards in the "odd year" than we do now. In 1874 Mr. Wood grafted two small trees with the Hubbardston Nonsuch; in 1878 they blossomed, and his boys picked off the blossoms; in 1879 the blossoms were left on; in 1880 they had comparatively few blossoms, and in 1881 they gave five bushels of apples each, while the tree from which the scions were taken did not show a blossom that year.

Mr. Wood spoke of an orchard in Marshfield from which the owner picked off the blossoms for three successive years, which so fixed the habit of bearing on the odd year that he never had to pick them off afterwards.

Charles M. Hovey said that the essayist had given us a very excellent paper, though he had not adhered very closely to the subject assigned. The speaker thought the great subject should occupy us rather than details. He was glad that Mr. Strong had recommended us to try everything and hold fast to that which is good. We can just as well take twenty-four or forty-eight varieties of roses as we can the same number of pears. Mr. Hovey would like to have many varieties of roses and dahlias, and the same with pears. He wants a different pear on his table every day, even if it will not sell in the market. We must consider the wants of amateurs. How should we ever have arrived at a knowledge of the Beurre d'Anjou, Doyenne du Comice, and Dana's Hovey, but for the persistent trials of every new fruit? The Dana's Hovey was introduced in 1854, and now its merits are just being recognized. The tree is most beautiful, and the leaf is as

handsome as the new leaf of the camelia. The fruit is superior to the Seckel. He had fifty bushels of Seckels, which sold for a dollar and a half per bushel, and a neighbor sold an extra quality for two dollars per bushel. The dealer who bought these offered fifty dollars for ten bushels of the best Dana's Hoveys, just as picked.

The speaker did not wish to increase the taxes on orchard land; high taxes would ruin apple culture in New England. Fruit culture ought to be protected as well as manufacturing, if the policy is the correct one. A farmer sends apples to England, and gets three dollars and eighty-seven cents, net, per barrel for them, and orders his agent to send him broadcloth; but he has to pay as much for each yard as he receives for a barrel of apples.

Mr. Hovey said that Mr. Strong had stated the price of pears at from three to six times as much as apples. The highest price the speaker ever received for pears was in 1870, when he sold three bushels of Seckels for twelve dollars per bushel; last year he received only two dollars per bushel. Last fall Merriam pears sold for from three and a half to four dollars per barrel, and Gravenstein and Baldwin apples were worth as much. Mr. Strong was thinking of old times. No other pear than the Dana's Hovey, unless some very fancy specimens, brought over two dollars per bushel last year. When Gravenstein apples were worth from two to three dollars per bushel, Beurre Superfin pears brought only one dollar. This does not look as though pears were worth from three to six times as much as apples. Pears are a perishable fruit, and, moreover, the general demand for them ceases with the coming of cool weather. Twenty thousand baskets of pears could not be sold in Boston now at any reasonable price. Bartletts come when they are wanted, and this makes them the pear of pears. He agreed with the late Mr. Stickney as to the value of the Bartlett. The speaker has two thousand bearing pear trees, which bore a thousand bushels last year; if they had been all Bartletts they would have brought twenty-five hundred dollars; but they averaged only about a dollar and a half per bushel. He would not, however, cut off and graft any variety until he had ascertained its value.

Mr. Wilder said that it takes time to learn the comparative

value of pears. In October last the market-men offered him two dollars per bushel for his crop of Beurre d'Anjous, which is much less than they bring in years when there is not such a superabundance as there was then.

It was unanimously voted to continue the discussion on the next Saturday.

Rev. A. B. Muzzey, chairman of the Committee appointed at the last meeting to investigate and record all facts in regard to trees interesting for their size, age, beauty, or historical associations, expressed the desire that all who are acquainted with such trees, or have information in regard to them, would communicate it to the Committee. It was voted to add two members to the Committee, and the Chair appointed Leander Wetherell and John B. Moore.

BUSINESS MEETING.

SATURDAY, January 21, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. Francis B. Hayes, President, in the chair. No business being brought before the meeting, it

Adjourned to Saturday, January 28th.

MEETING FOR DISCUSSION.

The subject was "Apple and Pear Culture," continued from the last week. The following paper was read: —

NEW VARIETIES OF PEARS.

By J. W. TALBOT, Norwood.

When a work is completed we like to know *how* it was done. If only half done, we certainly need to understand the process in order to finish it. This applies to the improvement and introduction of new varieties of pears. Van Mons, of Belgium, obtained and introduced several new and very valuable varieties of pears;

but that he did it understandingly is doubted by many of our best thinkers and workers. "He builded better than he knew." He adopted the theory that the seed of a good pear would produce an inferior fruit, and that to improve our kinds we must plant the seeds of wild fruit, and replant from them, and so on for several generations. He tried this, and really improved his fruit, and thought he had proved his theory correct; but he was mistaken, for he had overlooked one very important factor, which, without his knowledge, had really changed the result. If he had planted his wild seeds isolated from all other pears he would have found each succeeding generation precisely the same. But, planting beside other and better pears, each succeeding generation was improved by cross-fertilization. This was his mistake.

When Francis Dana, of Roxbury, selected seeds from the best varieties in his little garden, — seeds that had already been crossed only by the other choice varieties allowed to grow there, — and from one lot of seeds obtained more choice new varieties than Van Mons did in a long lifetime, it was apparent that he had refuted the theory of Van Mons. And here is where we stand now. The decision given last Saturday, by such men as Col. Wilder, Messrs. Hovey, Strong, Wood, and others, that Dana's Hovey is the best pear extant, not only approves the manner in which it was obtained, but demonstrates that cross-fertilizing, or hybridizing, the best varieties, is the sure way to success, and leaves us in the best position to go on to still higher attainments.

While it is possible that Mr. Dana also "builded better than he knew," still he took the way to remarkable success, — obtaining more good, and *remarkably* good, varieties from one lot of seeds than ever before known. And the glory of the thing is that the work is still onward. While men like Mr. Dana, Mr. Clapp, and others are crossing the best pears, Mr. Bull, Capt. Moore, Mr. Ricketts, and others are among the grapes, Col. Wilder, Mr. Hovey, Mr. Strong, our worthy president, and a host of others, are among the flowers, surely the work is going on.

The Horticultural Society need not be ashamed of its work, and I trust these faithful workers will not lay down their oars while new fields are to be investigated, and new laurels won. Mr. Dana's first experiment is not yet completed. Just before he

laid off his harness he caused the last of his first lot of seedlings to be taken up and put into the hand of Col. Eliphalet Stone, saying to him, "I have already put out several very valuable kinds, and there may be others among these better than any I have fruited." And if the gentlemen of the Fruit Committee, with Col. Wilder and Mr. Charles Downing, — whose judgment everybody respects, — have not made a decided mistake in their decision, the Seckel and Dana's Hovey will find a noble compeer in the President Clark, and probably in the Student, two more of Dana's seedlings. But while the remarkable success of Mr. Dana and Mr. Clapp has refuted Van Mons's theory, we shall do well to have the testimony of physiology upon the subject. It is now almost universally admitted that good culture and favorable circumstances will somewhat improve the size and quality of natural fruit, yet these will not essentially change its peculiar characteristics. It is equally true that wild fruit, growing isolated, does not change its character in successive generations. The well-known laws and methods of plant growth confirm this view.

William S. Clark, when president of our Agricultural College, in his invaluable essay, which Agassiz pronounced a revelation to physiologists that will rank our college among the scientific institutions of the world — in that essay, which evinces a thorough acquaintance with Prantl, Sachs, and all writers of note on the subject, called attention to the fact that while all plants and trees are composed of an infinite number of cells, yet from every one of these living cells, whether taken from the root, branch, leaf, bud, or seed, of a natural tree, can be produced a perfect tree, and that every tree thus reproduced will be precisely of the same kind. Indeed, the supposition is, that every tree or plant is formed or proceeds from a *single* cell. When one cell is formed, it immediately divides itself and forms two. These divide again, and so on, till from that first cell a whole tree of precisely the same nature is formed. These little cells, though alike when first formed, soon vary in size, shape, and function; still all are of the same nature, and all tend alike to build up the tree, and afterward to propagate its kind by its own seed. No natural tree ever changes its nature or its kind of fruit of its own accord. When this process of cell building has matured a tree, the work of propagation is com-

menced by another kind of cells, called fruit cells, or rather fruit buds. When these have blossomed there is found in the blossoms still another class of cells, called male and female cells.

The pollen of the blossom is composed of independent sperm or male cells, which detach themselves from the blossom and find their way, or are carried, to the germ or female cells, when the male soon disappears, and the female cell is found to contain an embryo plant, in what we call a seed, soon to be surrounded by the pulp of the fruit. This is the commencement of propagation by seed, and here the *new varieties* are formed. If the pollen or male cell is of the same kind, the embryo plant in the seed will be true to its kind; but if a male cell of another kind unite with the germ cell, the embryo plant in the cell or seed will be a hybrid or mixed cell, partaking of the nature of both kinds, but in itself will be a new and independent variety. It becomes a perfect embryo cell, and one from which not only a new plant is to be formed, but a new variety, as tenacious of its kind and peculiarities as any natural plant. It can never essentially change, except from the influence of some other plant, in the same way as it was itself formed. We can now see whence come our new varieties. When the germ or female cell in Mr. Dana's Seckel united with a pollen or male cell from his Winter Nelis, a new embryo cell or seed was formed, and that cell was Dana's Hovey, and every particle of that kind of wood in the world came from that one cell. Again, when the germ cell of Mr. Dana's Seckel was united with the male cell from the Belle Lucrative, the embryo cell of the President Clark was originated. When the germ cell of Mr. Clapp's Bartlett was united with the pollen or male cell of the Flemish Beauty, Clapp's Favorite was the result.

This is cross-fertilization, and it matters not whether these male cells were carried by the wind, by insects, or by Mr. Wilder's camel's-hair pencil, that has done so much such work; if the two cells are united, the result is equally a cross.

In this way came the Bartlett, the Seckel, the Baldwin, the Gravenstein; indeed every seedling that differs from the parent tree. Now, I suppose there is very little doubt in any well-informed mind that this is the way in which new varieties of fruit are obtained. But there is another matter, somewhat related,

about which there will be more difference of opinion. Sometimes nature is forced out of her regular course and produces some very curious anomalies. When, for instance, a tree bears sweet and sour apples united, — two halves of different apples apparently joined together, — and the trees continue to do it for a century or more, the quality being transmitted to other trees; when a limb that has always borne Baldwins, without any apparent cause suddenly bears russets; in short, when we see the large class of wonders which we call *sports* because we cannot understand them, we ask, when shall we understand these? I think President Clark, in his essay before the Massachusetts Board of Agriculture, in 1870, hit upon an advanced idea, which we may sometime better understand. Speaking of the mixing of qualities in hybrid fruits and flowers, and of sports by grafting, he says it may be possible that a part of a cell of the graft may unite with a part of the cell of the stock, and thus form a kind of mechanically crossed cell which will produce itself with infinite variations. May not this be the key to the mixed apple; to Mr. Meehan's experiments with split buds; and to a multitude of wonders that have long perplexed the curious? But these are of little importance compared with the process of hybridizing, which is giving us our best varieties of fruits and flowers.

Discussion.

Charles M. Hovey said that, according to his observation of the experiments which have been made in raising new pears, the essayist is correct. The practice of Van Mons's method would result, even without cross-fertilization, in the production of new varieties, We have the Seckel, Lawrence, Pratt, Sheldon, Brandywine, and other fine pears, of the origin of which we know nothing more than that they were found growing wild, and are not the results of artificial fertilization. Those who raise new fruits are often mistaken in regard to their parentage; for it is exceedingly difficult to keep correct records, and fruits are thought to be seedlings which are not. Van Mons received the Fondante des Bois pear and grafted it in his nursery, and when Mr. Braddick visited him he extolled the Beurre Spence, which he claimed as one of his seedlings, as the finest of all pears; but this has finally proved,

after repeated attempts to obtain the true variety, to be only the Fondante des Bois, or, as it is commonly called here, the Flemish Beauty. Many years ago, when the Lewis pear was introduced, the speaker planted six or eight trees; but it proved to be a small, green, unprofitable fruit, and he grafted them over with Beurre Bosc. Two or three years ago he found on some of his Beurre Bosc trees a small green pear, which would have led some persons to suppose that the Bosc had sported; but it proved that the man who was sent to cut Bosc scions, from the trees which had originally been Lewis, had cut the shoots which often spring from the grafted branches.

The Sheldon, which is one of the finest of pears, has not been appreciated, but, on the contrary, is not in so good demand as a few years ago, and the speaker asked why the price of the varieties of finer quality, like Sheldon and Beurre Superfin, has depreciated. He read, from a memorandum of his sales of pears from 1862 to 1879 inclusive, the prices obtained for Bartletts, Merriams, Buffums, and Sheldons, showing that the highest price of the first was six dollars per bushel in 1868, and the lowest one dollar and twelve cents in 1879; of the Merriam, four dollars and seventy-five cents in 1868 and 1869, and one dollar and three cents in 1879; of the Buffum five dollars in 1864, 1865, and 1866, and fifty cents in 1878 and 1879; and of the Sheldon eight dollars in 1867, and one dollar and twenty cents in 1879.

Mr. Hovey recommended the Beurre Superfin and Pratt as, with the Sheldon, three of the finest pears. He expressed the opinion that the Society has not done anything lately to extend the cultivation of pears of superior quality. Premiums are now offered simply for single varieties instead of for collections, and the kinds selected are such as will sell best in the market. He has sometimes thought that the fewer new pears we have the better. The Beurre d'Anjou is valuable for its long season; but the Sheldon is superior to it in quality.

Mr. Talbot asked if the quickly perishing nature of the Sheldon is not a cause of the low estimation in which it is held in the market.

Mr. Hovey thought it was not.

Robert Manning thought that the suddenly decaying nature of the

Sheldon is the cause, and the only cause, of its unpopularity in the market.

Leander Wetherell asked whether the tree is a good grower.

Mr. Hovey replied that no fault could be found with it in this respect.

William C. Strong asked whether it does not sometimes crack.

Mr. Hovey had seen a very few cracked. The Columbia is a capital winter pear, but it has the great fault of blowing off the tree; he could not get six bushels from twenty-five trees in exposed places. The stem is brittle, while that of the Vicar of Winkfield gives, so that the pears seldom blow off.

He thought the Society could not do better than to encourage in every way the orchard culture of the apple. He spoke of a project before the Legislature to encourage the growth of timber, and thought it would be well for the Society to petition for the exemption of orchards and timber lands from taxation. In apple culture, as in all else, the small farmers are at the mercy of the large. Packing is of the highest importance; the man who packs makes the money. Purchasers of apples will not buy those poorly packed, except at a very low price.

We need to bear in mind that we cannot judge of the value of a new fruit under ten years' trial. The Doyenne du Comice is of inestimable value, though the twigs are sometimes winter-killed. It was brought to this country in 1851, when the late Hon. Joseph S. Cabot, afterwards president of this Society, and the speaker, sent to André Leroy orders for new pears, Mr. Hovey's including fifty trees of the Doyenne du Comice. Though introduced before Dana's Hovey, it is even now little known, and probably not twenty bushels are sent to Boston market annually. The speaker agreed with Mr. Strong, that a few varieties are more profitable for market than many. But the promotion of market culture is only part of the purpose of this Society; it is important to have new pears, and to encourage their introduction. The Dana's Hovey resembles the Seckel in habit of growth.

Mr. Talbot said that a Seckel and a Winter Nelis tree were prominent in Mr. Dana's yard.

Mr. Hovey said that Mr. Dana saved the seed of all good pears that he ate. He produced about six good varieties, including the

America, Augustus Dana, and Excelsior. The Augustus Dana is delicious, but a miserable grower. The Shawmut cracked and rotted at the core. Out of the best six varieties originated by Mr. Dana, the Dana's Hovey is the only one that really does him credit.

Mr. Wetherell asked Mr. Talbot how, on the principles laid down by him, he explained the production of a new variety of fruit greatly superior to either parent.

Mr. Talbot said that Mr. Dana gave Col. Stone to understand that the seed from which he raised his new pears came from his own garden, — perhaps not all, but nearly all; and Mr. Talbot thought there was a strong probability that the Dana's Hovey came from the union of the Seckel and Winter Nelis.

Hon. Marshall P. Wilder said that when the Columbia pear was first brought to notice he was anxious to test every new variety, and he got half a bushel of them from John Thorburn at an expense of fourteen dollars. He wished to bear testimony to Mr. Dana's zeal for the truth and fairness of statement so far as he knew; but his trees were crowded, and it was difficult to ascertain what his crosses really were. All honor to him; the pear which bears his name in conjunction with Mr. Hovey's will perpetuate his memory. Van Mons was one of the illustrious pioneers in fruit culture; but the speaker in his address before the American Pomological Society, in 1856, alluded to him as proceeding on an incorrect theory. The essayist today has stated the fact fairly, — no wild seedling will ever change unless fertilized by some other variety. Van Mons not only raised new varieties, but collected them wherever he found good kinds, and planted them in the same orchard with the parents of his seedlings, and he could no more prevent cross-fertilization among them than he could among corn, or squashes, or melons. No man in his day did so much for the production of new fruits. The speaker had visited his old garden in Belgium, and wished to give all honor to him.

We desire to stick in a pin where we have established a fact; and these facts in regard to the production of new fruits by Van Mons are well settled. So, also, are the principles respecting the overbearing of trees. The advantage of taking off the blossoms of Baldwin and other apple trees in the even year is estab-

lished, and needs no further discussion. Mr. Wilder quoted from the last report of the American Pomological Society an instance where an enthusiastic old orchardist, in this State, at an expense of sixty dollars, removed the blossoms from his trees in 1880, and as a result harvested six hundred barrels of apples in 1881, which he sold at the orchard for twenty-one hundred dollars. The principle in nature is simple: if a man or a beast is overworked it must have rest; and it is the same with a tree.

Pear blight is a mystery which we know nothing about. It comes in a certain region for a time, and then disappears for fifteen or twenty years. In Messrs. Clapp and Wood's orchards some varieties have blighted, while in the speaker's the same kinds have not. It may strike the same varieties again. He was surprised to hear that the Beurre Bosc blighted. The cause may be in the soil, or it may be in currents of air.

Mistakes will sometimes occur with the most careful cultivators. A bud will sometimes spring out from the stock, and take the lead of a graft. If not ascertained, scions from it may be disseminated, and in this way many varieties are sent out under wrong names. In regard to such pears as the Buffum and Doyenne Boussock, which he had recommended, Mr. Wilder said that in 1879 he had a hundred and sixty bushels of Buffums, which averaged over a dollar per bushel, and a hundred bushels or more of Merriams, which brought more than the Buffums.

Mr. Hovey said that in 1879 the crop was larger, and the season was dry.

Mr. Wilder said it was wonderful that Van Mons, with such parents as he had, could produce such pears as Beurre d'Anjou and Beurre Bosc. If the Seckel and Winter Nelis are crossed they cannot produce a poor pear. He did not think that seedlings from such kinds would ever run back; running back is not the law, but the exception. "Give me a good son," said he, "and I will show you that he had a good mother."

Mr. Hovey asked Mr. Wilder whether all his seedlings from the Beurre d'Anjou were equal to the parent.

Mr. Wilder replied that they are all good, but none superior to the parent. He went on to speak of the progress of pomology in this country, which he said was unsurpassed by anything on

record. When he wrote his last address for the meeting of the American Pomological Society, he thought some might consider his prophecies extravagant; but every part of our country has its fruits; even on the line of the Northern Pacific Railroad, the native grapes festoon the trees, and improved kinds can be grown from them. In New Mexico figs, oranges, and other fruits are abundant; indeed, fruit is reported from every State and Territory, even the Indian Territory. Texas is larger than the New England and Middle States and Maryland together, and in respect to climate may be divided into three portions, in the southern of which pear blight is unknown. In Georgia a fruit grower has planted an orchard of six hundred acres of one variety of apple, the Shockley. The utilization of cotton seed is destined to prove the greatest regenerator of the soil in the South. For every bale of ginned cotton half a ton of seed is produced, worth twelve dollars per ton. This yields thirty-five gallons of oil per ton, worth forty cents per gallon in the crude state, and the cake is worth eighteen dollars per ton for cattle food. Providence is providing for us.

John B. Moore asked Mr. Wilder whether he had ever raised a better strawberry than the President Wilder.

Mr. Wilder said that in former years he never could get a better one than the Hovey, and, after repeated trials, concluded it was useless to try. But when La Constante came, with its beauty of form and color and fine quality, he made the attempt to combine these new characteristics with those of the Hovey, and, out of sixty-four seedlings, two, the President Wilder and No. 60, were evidently superior. But there is a point beyond which you cannot progress, and in quality and beauty of form and color the Wilder is thus far unsurpassed.

Mr. Moore asked Mr. Wilder whether he had not raised a great many poor strawberries.

Mr. Wilder said he had already stated that out of sixty-four seedlings only two were superior.

Mr. Hovey said that his experience in raising seedling strawberries did not agree with Mr. Wilder's view, that it would be impossible to produce a poor pear from a cross between the Seckel and Winter Nelis. In raising cross-fertilized seedling

strawberries five hundred out of a thousand were poorer than either parent, and it would be the same with a cross between the Seckel and Winter Nelis.

Mr. Wilder said that the condition of the parents when impregnation takes place is most important. When the flowers are imperfect, as good results cannot be expected as when the pollen is applied at the right moment of contact.

Mr. Hovey asked haw Mr. Talbot accounted for the superiority of the Duchesse d'Angouleme pear, which was found growing wild in a hedge, or of the Seckel.

In answer to an inquiry as to the method pursued in raising the Hovey's seedling strawberry, Mr. Hovey said that he had cultivated thirty varieties, and found that most of them suffered from the winter. He selected six plants, one or two of which were Early Virginia, and cultivated them carefully, and, before the flowers are opened, pushed away the petals, and cut out the stamens, and applied the pollen of six different varieties. They were then covered with gauze to prevent fertilization by any other means.

Mr. Talbot said that Mr. Hovey took the qualities of the Early Virginia, and, by crossing them with other varieties, brought out other qualities.

In reply to Mr. Hovey's question, how he accounted for the excellence of the Duchesse d'Angouleme and Seckel pears, he said the same might be asked concerning the Bartlett and other varieties. Every seed contains an embryo plant, made by its own kind, or by crossing with some other. He agreed with Mr. Wilder that the condition of the male and female cells which produced good kinds was favorable at the moment of crossing. We cannot know the condition of all the seedlings. In Winchester, pollen was carried by the bees and formed the Baldwin apple. Every seed not fertilized by a different variety will reproduce itself. If kept isolated it will never change.

John B. Moore, in reply to a question from Mr. Wilder, concerning the Early Concord corn, said that he was obliged to keep up the quality by selection. The idea had been held out that in raising new fruits you have only to sow the seed of good kinds to get all good varieties; but his experience in raising seed-

ling strawberries had been the same as Mr. Hovey's. So, also, in raising grapes; when you put the pollen in contact with the stigma, you are not sure of anything but that you will get many poor ones.

Mr. Hovey said that in England he visited a dahlia grower, who raised an acre of seedlings every year, but never saved more than five as good as the parents. It is the same with pelargoniums; Mr. Beck raised a house-full every year, but saved only five or six better than the parents. In any fruit or flower we may be sure of the same result. The essayist is so far right, as that by bringing two varieties together we gain a little. Cultivation does more, and then comes a "break." Rhododendrons were cultivated many years without change, until the Himalayan species were introduced and crossed with them. In a hundred pears crossed with the best varieties, seventy-five may be poor, twenty-four good, and perhaps one better than the parent.

Mr. Talbot said that Sachs comes to the conclusion that the cell is never permanently changed by cultivation.

Mr. Wetherell said that Mr. Talbot had told us that if we plant any variety of fruit, the Baldwin apple, for instance, away from all other varieties, the seed will reproduce the parent; but the speaker thought that the parents of the Baldwin might crop out in the seedlings from it. Robins and chipping squirrels, in a state of nature, produce the same, from generation to generation, but when domesticated they change. How can we explain the fact that a thorough-bred animal mated with a scrub produces a larger animal than either of the parents; and, if a cow, one that will give more milk than the mother? How can we account for one good factor and one poor one producing a better result than two good ones? Why do Mr. Moore and Mr. Hovey, in raising seedling strawberries, get so many inferior results from two good factors? If you cannot change the germ, how have we got the improved varieties of fruit?

Mr. Talbot said that one of the conditions of producing an improved variety is that the male and female cells must be in the best condition; but this might happen only once.

Mr. Hovey said that the largest fruited species of strawberry were introduced into Europe from this continent. One of these

is the Chili, of which a friend brought him some fruit from its native country, where they are sold strung on strings. Another species is the *grandiflora*, from Surinam. When the European strawberries were fertilized with these, large varieties were the result. All the improved garden azaleas are hybrids, between *nudiflora*, *Pontica*, *viscosa*, and *calendulacea*. If two apples are crossed, new varieties are produced.

Mr. Wilder said that you must take the best parents to produce the best results.

William C. Strong expressed his full sympathy with all who were experimenting to produce improved fruits. He thought Mr. Dana's experiments very encouraging, and that we ought not to be discouraged by the large percentage of poor fruits. Darwin has demonstrated that the tendency of cross-fertilization is to improve, and that of self-fertilization is not.

J. W. Manning said that the Baldwin apple originated in Wilmington, and not in Winchester, as stated by Mr. Talbot. John Butters, of Wilmington, in 1863, when he was eighty-three years old, told the speaker that it originated on his grandfather's place, and that he had eaten fruit from the original tree. It seemed to be earlier than those grown now, and had yellower flesh. The reason people do not find apple raising profitable is that they do not raise all Baldwins.

It was announced that on the next Saturday Warren H. Manning would read a paper on "The Best Hardy Herbaceous Plants and their Culture," and that the discussion following would be opened by C. M. Atkinson and Joseph H. Woodford.

Rev. A. B. Muzzey, on account of other engagements, resigned his position as chairman of the committee to collect information in regard to trees, interesting for their size, beauty, or historical associations, and Hon. Marshall P. Wilder was appointed in his place. Robert Manning was added to the committee.

BUSINESS MEETING.

SATURDAY, January 28, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, President Hayes in the chair. No business being brought before the meeting, it

Adjourned to Saturday, February 4.

MEETING FOR DISCUSSION.

This was opened by the reading of the two following papers by the authors: —

THE BEST HARDY HERBACEOUS PLANTS AND THEIR CULTIVATION.

By WARREN H. MANNING, Reading.

It is evident that there is an increasing interest in the cultivation of hardy herbaceous plants.

The use of tender plants and annuals for bedding purposes in summer decoration has been in vogue for about a quarter of a century, and they have almost entirely superseded hardy herbaceous plants for general cultivation. Extremely brilliant and beautiful effects are produced by them in beds, ribbon gardening, and mosaic work, — and, in many situations, it is not desirable that they should be superseded by anything less showy; but that hardy herbaceous plants should be used more generally in the place of tender plants and many annuals, and to a considerable extent for bedding purposes, is desirable.

The yearly renewal of tender plants requires a considerable expense every spring, when there are no means for keeping them through the winter. When such means are at hand, a skill in propagation, preparation of the soil, and after-cultivation, that most persons are unable to give, is required to insure success. The seeds of most annuals must be carefully gathered each fall, planted in the spring, watched and cared for during germination, and then often transplanted or thinned out. These plants seldom

afford flowers until June or July, and are killed by the first frost; and after this the bed is a mass of decaying vegetation or bare earth.

Hardy herbaceous plants, the first cost of which is but little more than tender plants, in good garden soil will live and blossom without failure, year after year, and are continually increasing, so that a person, with little trouble or expense, can enlarge his own stock of plants and give to his neighbors.

With a proper selection of one or two dozen species, flowers will be had from the time the ground is open in the spring until it is closed by the severe frosts; and with a greater number of species and varieties all colors can be found among the flowers at any time during the season, and in a collection of hardy herbaceous plants there is a never-ending variety and source of investigation, study, and experiment. For the lover of flowers there are new beauties every day, and new flowers open for his pleasure at short intervals. For the botanist a large collection of herbaceous plants is a valuable field for study and investigation. For the horticulturist there is an immense field in the introduction of new species, in the cultivation of rare and difficult species, and, above all, in the development of this class of plants, or certain sections of it, by hybridization, by selection of the best seeds and seedlings, and by careful propagation of sports and curious seedlings.

See what has been done with the Hollyhock, Phloxes, Irises and Delphiniums; why not improve other flowers as well? In England the Pentstemons of our country are found to vary freely under cultivation; and fine varieties have been obtained in all shades of red, blue, and orange scarlet. Here is a broad field for any cultivator who wishes to work up some specialty. The Anemones are another promising class for cultivators; the beautiful European varieties of *Anemone coronaria* are not hardy here; but there are hardy species and varieties, with shades of red, blue, white, yellow, and greenish-yellow, and double varieties. The Lilies are a most interesting class for the hybridizer to work among, and many other promising flowers might be mentioned; but any person who is sufficiently interested will find them for himself.

Where room and money are limited, a hardy herbaceous bed is

preferable to the usual bed of tender plants or annuals. The herbaceous bed may not be so showy, but to the constant observer it is many times more interesting.

The usual arrangement of a hardy herbaceous bed is with the taller plants behind, or in the middle, descending gradually to the low-growing species on the edge. Regard should be had to a proper contrast of colors, and a sufficient variety in the plants; but we can vary this arrangement and produce fine bedding effects with hardy plants.

Funkia Sieboldii variegata, the Variegated Day Lily, is strongly and beautifully marked with yellow, has a finely formed leaf, and stands the sun. The colors in this, as well as in all variegated herbaceous plants, can to a great extent be prevented from fading by picking the flower buds. This plant would make a fine bed, and be effective earlier than tender plants, and the colors would last well through the season. The other variegated varieties of the Funkia do not stand the sun well, but would make nice beds in shady spots, where few other things would grow.

The variegated Symphytum or Comfrey has a very bright yellow and dark green variegation, and forms a graceful tuft of large leaves that would be fine for the centre of a bed.

Centranthus ruber, the Spurred Valerian, has a light glaucous green foliage, and a profusion of carmine flowers through the summer.

Spiræa Ulmaria variegata has a cushion of pinnate leaves, marked with a broad patch of yellow through the centre of each leaflet, and it holds its color remarkably well, even after flowering.

A bed of *Phlox amœna* bordered with *Phlox subulata*, having some of the choice varieties of common Phlox in it, would furnish flowers from the first of May to the middle of October, and the ever green leaves of the low-growing species would keep the bed looking well the remainder of the year. If the fading flowers of the common Phlox are picked, flowering side-shoots will be thrown up that will greatly extend the season of flowering; and I will add here that if this Phlox is divided in the fall, just after flowering, the pieces will form fine blooming plants for the next year.

Dicentra eximia has beautiful fern-like, glaucous leaves, and clusters of pink-purple flowers that are produced through the sum-

mer and into the fall. *Dicentra spectabilis* would make a fine centre for a bed of the foregoing, and if it is cut back as soon as the flowers are developed, to stimulate a new growth, it will flower from May to September.

A bed of lilies having the surface of the ground covered with *Phlox subulata*, *Cerastium Biebersteinii*, or other shallow rooting plants, would no doubt be effective and successful. The foliage of the covering plants would be pleasing through the winter, the flowers would add their charms in the spring, while the lilies were developing, and, above all, the surface plants would keep the soil and the stems of the lilies cool in summer, and protect them in winter, — conditions that would be very favorable to the lilies. It is a good plan to place a handful of coal-ashes about each lily bulb when it is planted, to prevent decay and to drive away insects.

Many other combinations can be made, and when the same amount of study, care, and investigation is given to the hardy plants as has been given to the tender ones, I believe that equally as fine effects can be produced with them.

Hardy herbaceous plants with large ornamental foliage are not numerous. *Bocconia Japonica* has a very fine foliage, and would be more valuable if it would only stay where it is put. Probably many plants will be found that will make fine foliage effects.

Grass beds are very graceful, and look well from early in the season until severe frosts.

Eulalia Japonica variegata and *E. Japonica zebrina* are great additions to this class of plants. They require a little protection in winter.

Festuca glauca, a low-growing grass, forms a mass of fine, glaucous leaves with a distinct bluish tinge, — a very striking color. This plant is nice for a border, and would make a fine contrast with other plants.

Panicum virgatum is fine in foliage and flower.

Aira variegata is a pretty dwarf grass, with a bright yellow stripe.

Arundo donax, and the variegated variety, are effective in a grass bed, but require protection in winter.

Acorus Calamus variegatus, the Variegated Sweet Flag, is pretty, and does well not only in wet land, but also in a good garden soil.

The wild garden is a desirable feature in an estate where there is plenty of room and a suitable place. Here fine foreign flowers can be introduced among the already growing natural ones with fine effect; beautiful aquatics in the waters; bog plants in their places, and woodland plants among the trees, giving each plant the place most suited to it; and the natural beauties of a place can be greatly added to without giving an artificial appearance.

Hardy succulents are used with a fine effect in succulent beds, and they will no doubt have a more prominent place in the future garden. They will grow in the most barren spots. In many of them the arrangement of the leaves is very pretty, and others have fine flowers.

The plants mentioned in this paper require no special cultivation; they will all succeed in good garden soil, which should be well enriched when they are planted, and whenever the roots are divided and reset, which should be in the fall, with protection through the winter, or early in the spring, and as often as every three or four years, or they will exhaust the soil about them, and begin to die out in the middle, or will disappear entirely.

The beds should be kept free from weeds. Many of the tall-growing plants will require staking; the stake should not be conspicuous, and care should be taken that the form of the plant is not disfigured by tying.

Delphiniums, Aconites, and probably many other plants, can be made to flower the second time by cutting down the growth as soon as the flower fades. It is better to grow Aquilegias every other year from seed, as they are liable to disappear after a season of flowering.

I would name the following additional list of hardy and desirable plants: —

Achillea tomentosa.
Aconites in variety.
Anemone Japonica, White and Pink.
" Pulsatilla.
Aquilegia chrysantha.
Aquilegia cærulea.
" Canadensis.
Asclepias tuberosa.
Ajuga reptans and the variegated var.
Astilbe Japonica.

Campanula Carpatica and vars.
" rotundifolia and vars.
" Trachelium and vars.
Clematis coccinea.
" recta.
The other beautiful clematis are often classed among herbaceous plants, and are all very desirable.
Convallaria majalis, and the variegated var.
Crocuses in variety.
Dianthus barbatus.
" plumarius.
Dictamnus Fraxinella.
Dodecatheon Meadia.
Erigeron bellidifolius.
Eupatorium Fraseri.
Funkia ovata.
" subcordata.
Gentiana Andrewsii.
Gladiolus, hardy species and vars.
Gypsophila paniculata.
Helianthus decapetalus.
" multiflorus plenus.
Helleborus niger.
Hemerocallis flava.
" graminea.
Hollyhocks in variety.
Hyacinths in variety.
Iberis corifolia.
" Gibraltarica.
" sempervirens.
Iris, the many hardy species and varieties.
Jonquils in variety.
Liatris scariosa.
" spicata.
Lilies, the many hardy species and varieties.
Lobelia cardinalis.
Lychnis Chalcedonica and vars.
" diurna flore pleno.
Lysimachia Nummularia.
Lythrum roseum superbum.
Narcissus in variety.
Opuntia Rafinesquii.
" vulgaris.
Pæonia, the species and varieties.
Papaver orientale.
Pentstemon barbatus *var.* Torreyi.
" Cobœa.
" grandiflorus.
Platycodon grandiflorum (white and blue).
Rudbeckia maxima.
" nitida.
Saxifraga cordifolia.
Sedum Fabaria.
Sempervivums, species and varieties.
Solidago Virgaurea *var.* alpina.
Spiræa Aruncus.
" Filipendula.
" lobata.
" palmata.
" Ulmaria and variegated vars.
Tulips in variety.
Uvularia grandiflora.
Valeriana officinalis.
Veronica pulchella.

Herbaceous Plants and their Culture.

By Joseph H. Woodford, Newton.

When an extensive border for hardy herbaceous plants is to be made, the ground should be deeply dug and well manured before planting. The border, if possible, should be in front of evergreens and shrubbery, avoiding nearness to large trees, as they send their roots abroad and take the goodness out of the border.

In selecting plants one must carefully study their habits and know the color of their blossoms, and then by judicious planting the desired effect can be attained immediately. Select only good kinds of plants, because there is no scarcity of such, and reject poor and weedy kinds. The best time to plant the border is in the fall, as the flowering plants will bloom better the next season than if set out in the spring. But I would not discourage any one from spring planting, because it is better to do it then than not at all. There is an endless variety of plants to select from, so that one can produce any effect desired, and among the most beautiful are the Larkspurs. These grow from two to eight feet high, with colors of every shade of blue; and they succeed in any good garden soil, but are improved by liberal manuring. They can be increased by division of their roots or by seed. Their style of growth is bold and striking, and a succession of bloom can be kept up by removing the centre spike of flowers, when new flowering shoots will break from the main stalk. The next class of plants I would recommend is the Phlox. These vary in color from pure white to all shades of crimson, red, and purple, and they are very beautiful. The soil and culture required are the same as for Larkspurs, and they can be had in bloom till frost by taking out the centre of each spike. They form beautiful clumps from eighteen inches to four feet high. *Anemone Japonica* is another splendid plant for mixed borders, growing about three feet high and blooming in the fall; colors of bloom, white, red, and pink. *Lobelia cardinalis* has a spike of very brilliant scarlet flowers, growing to the height of from two to three feet. This, also, can be prolonged in bloom till late in the season, by cutting out the centre spike of flowers. This color is desirable, for it enlivens a border amazingly.

The Day Lily (*Funkia*) is beautiful for its bold foliage and spikes of pure white, trumpet-shaped, sweet flowers. The beautiful variegated foliage of the *Funkia Japonica* is most desirable for edging.

Dielytra spectabilis is a very graceful plant, and the Pæonies are very desirable. I call to mind a large bed of these on John S. Farlow's place — one of the most striking beds of flowers I ever saw. *Spiræa palmata* is a good plant. The Aquilegias, or Columbines, are another desirable genus, because of their endless variety of bloom. The Foxglove shows a beautiful variety of colors, and the habit of the plant is good.

The *Astilbe Japonica* is very chaste, both in flower and fern-like foliage.

Asclepias tuberosa is very desirable; so are Lychnis and Campanula in groups; also *Trillium grandiflorum*, and Statice, and Iris in variety. Solomon's Seal is very graceful. *Eulalia Japonica*, and the variety *zebrina*, are two grasses from Japan, and are of beautiful habit and make handsome specimens. The Lily of the Valley we all know about, and I would advise growing it in light, sandy soil, and fully exposed to the sun, and then a profusion of bloom is the result. The great family of Lilies, nearly all of them magnificent, must not be overlooked, as they belong to the class of plants under discussion; also the Tulips, Hyacinths, Crocus, and Narcissus. What is more beautiful than *Narcissus poeticus*, and the Jonquils, and Daffodils, in the early spring-time?

In fact, I might enumerate hundreds of others equally desirable for the herbaceous border; but I will close my remarks by saying, that only those who have a love for floriculture, and the time to devote to it, can succeed in the cultivation of plants, and justly appreciate the beauties which a beneficent Providence has given us so freely.

Discussion.

Robert Manning, being called on, said that few are aware of the beauty and variety shown by hardy herbaceous plants when just pushing out of the ground in the early spring. Sometimes we must brave a walk in the mud to get a sight of them, for they are the first tokens in the flower garden of the great annual resurrec-

tion. The *Lilium umbellatum*, with its white, fleshy shoots, like asparagus, but soon making a green rosette, in which the spiral arrangement of the leaves can be distinctly traced; the *Mertensia Virginica*, almost black in color; the red fringes of the *Dielytra spectabilis;* the Funkias, with their stiletto-like points piercing the earth; the Phloxes, ranging from green to dark purple; and, most beautiful in color of all, the despised Poke root, varying from green to orange and bright red, are some of the most striking. He had cultivated the Poke for its large foliage, its pretty white flowers, and strings of dark purple berries, of which the birds are very fond. The flowers continue to appear until frost, so that there are flowers and fruit, in all stages of ripeness, on the plant at the same time. No other herbaceous plant produces such an extraordinary quantity of organized matter in a season. It has been recommended in "The Garden," and also by William Robinson, the editor, in his book, "The Wild Garden," as a foliage plant.

Mr. Woodford said that the ground for a border of herbaceous plants should be dug deep and well manured. If he could have but one, he would have it deeply dug, and give up the manuring, the former being the more important. He spoke of the beauty of a clump of *Eulalia Japonica*, four feet broad, which he saw at John L. Gardner's place, and of most beautiful Lilies of the Valley at Miramichi, New Brunswick, grown in light yellow sand, but well manured, and every root having a spike of flowers. This plant is generally most neglected; sand may be added to the soil where it is planted, with benefit.

Mrs. C. N. S. Horner said that she has a variety of larkspur which last year grew seven feet and four inches high, with flower-spikes fourteen inches long. She has given it no extra care, but has cut out the centre spike to prolong the bloom. She was unable to say what variety it is.

C. M. Hovey said that Mrs. Horner's larkspur was probably one of the Bee larkspurs, — a very showy and beautiful, but neglected species. He was glad that the subject of herbaceous plants had been brought up. Mr. Woodford had touched on points which need elaboration, because valuable; among others that of pinching out the main flower spikes of plants to prolong the bloom. Four years ago the speaker resided on the shores of

Buzzard's Bay from the first of July to October, and before he left, the ground, which had been mown the latter part of June, was covered with asters and golden rod. There were also little stocky plants of *Hibiscus palustris*, with eight or ten branches and covered with flowers. The growth of bedding plants has encroached on the culture of the plants under discussion, but it is a mistake to allow foliage plants to take the place of flowers. Mr. Hovey alluded to a discussion of the subject in "The Garden,"[1] when lists of the best herbaceous plants were requested, and were furnished by the Duke of Sutherland's gardener and others, and he was astonished to see that so little progress had been made in this direction in forty years. In 1836 the speaker gave in the "Magazine of Horticulture" a list of the herbaceous plants in bloom in his garden from May to October, and in the list in "The Garden" not an additional plant was mentioned, except such as had been introduced since that date.

The *Asclepias tuberosa*, or Butterfly Weed, is probably the most beautiful of all our native herbaceous plants. It grows naturally in sandy soils. The Lily of the Valley is planted in out of the way places. When the best flowers are wanted the way proposed by Mr. Woodford is right. If cultivated as recommended by him they will give fat flowers, and make the prettiest carpet. The lilies are one of the most beautiful classes of plants, but many of the most showy, such as *L. umbellatum*, *L. Philadelphicum*, and *L. Canadense*, have been neglected for the White Lily. At Sandwich and Middleborough he saw *Lilium superbum* flourishing in the highest perfection wild, but never cultivated, while the Tiger Lily is planted by the door-steps all over the cape. He could recollect the Pæony longer than any other flower; when a child he saw the old red Pæony in Newton. Now the French, German, and American florists have raised many magnificent varieties. He had himself cultivated an eighth of an acre, and his collection comprised a hundred varieties. No other flower will make such a display, but they should be massed instead of being scattered, as they usually are. The Phloxes are very beautiful; not so much is said of the early species, such as *subulata* and *setosa*, as should be. Many pretty varieties have been produced, of varied color and dwarf habit. We need low plants as well as tall. Sunflowers

[1] Vol xvii., pages 191, 280, 418.

are fashionable, but we want Violets also. Tulips and Hyacinths, to give satisfaction, should have prepared beds by themselves. One reason why bulbs are not cultivated is that they are apt to be destroyed when planted in a mixed border. He agreed with Mr. Woodford that a deep soil without manure would be preferable to a shallow soil with manure, but would rather have both a reasonable depth and the manure. Herbaceous plants should be set away from trees and hedges. Arbor Vitæs do not do much harm, but Privet and Buckthorn exhaust the soil for ten feet around, and when the ground is dug in the spring you can take out masses of roots. Herbaceous plants require plenty of water to produce the finest flowers, and should be removed as often as once in five years, as they exhaust the soil around them.

George Webb said that he had two clumps of Pæonies which do not flourish, though they have been manured, and asked the best way to treat them.

Mr. Hovey said they should be removed to another place, and then the flowers would be larger and of superior beauty.

John S. Martin said he had Pæonies which had not been transplanted for nearly twenty years, and are still flourishing.

John B. Moore thought that the cultivation of herbaceous plants is very important, and had not been strongly enough impressed. He enforced the necessity of frequent renewals. Phloxes always bloom best the first year; large clumps, especially, cannot be well supplied with manure without removing. They will not bloom as finely in old soil as in new; gardeners understand the importance of getting rid of the old soil. There are exceptions, however, for he knows a plant of the old red Pæony which has not been removed since he can remember, but it gets a dressing of dust and leaves which decay. He prefers a border largely of perennial flowers to a ribbon or carpet bed, and thought the former should take the place of the latter. Mr. Woodford's advice to dig deep is correct; he would dig deep anyhow, but it is a principle of farming, that if you have not much manure you can raise better crops of corn or grass without stirring the soil deeply. If the speaker had not over fifteen loads of manure per acre, he would not plough more than six inches deep for corn.

Mr. Hovey said that the needs of herbaceous plants are not analogous to those of a crop of corn, which requires warmth, like

grape vines. Herbaceous plants need moisture, to grow through the season.

Mr. Moore said that he would dig deep, and manure also. If you haven't got manure you must get it; there should be a law to prevent people from planting without manure. Two feet is pretty deep digging; if soil is moist it need not be dug so deep; he would not dig more than fifteen or eighteen inches deep for roses. When younger he had an Isabella grape vine, which bore very fine fruit; but he wanted better, and prepared a border, not more than thirty feet away from the first vine, three or four feet deep, with bones, meat, etc.; but never could get grapes as early, or half as good in quality, or half as handsome bunches, as from the old vine. The surface of the soil should be kept constantly stirred; this prevents evaporation. There is no doubt that removing the centre stalk of flowers from a plant will continue the bloom later. He had had flowers cut down by a hailstorm, and they gave a fine crop of late blooms. The principle is, prevent early bloom, and you will get late. In dry weather herbaceous plants should have plenty of water. He had not planted Lilies of the Valley, but thought his whole farm would grow them.

William H. Hunt thought a display of flowers could be obtained from hardy herbaceous plants with less trouble than in any other way. He enforced the importance of dividing and transplanting. His earliest recollections of flowers were of the Lily of the Valley and Pæonies; but though he had cultivated them successfully they had not done as well as on the old place. He has allowed them to remain in the same position for a dozen years. The Solomon's Seal, when transplanted to the garden, comes up earlier and grows to twice the size that it does in the woods.

Mr. Hovey spoke of the cultivation of the Lily of the Valley by the Germans, who prepare the ground thoroughly, and in autumn plant young roots in rows and cultivate carefully for two years, when they are all flowering roots ready for sale. To keep them in fine condition they should be divided every fourth year. He thought they would not do better in the shade, as they grow naturally in the sun. The development of the flowers is dependent on the development of the leaves.

It was announced that the discussion of the subject would be continued on the next Saturday.

BUSINESS MEETING.

SATURDAY, February 4, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair.

William E. Endicott, Chairman of the Library Committee, announced the donation to the Library, by the eminent pomologist, Charles Downing, of Newburg, N.Y., of the rare edition, with colored plates, of the "Fruits and Fruit Trees of America," by A. J. Downing, brother of the donor, and also of the latest edition of the Second Revision by the donor, of the same work, with Three Appendixes, the whole containing descriptions of two thousand and eighty varieties of apples, one thousand and fifty pears, and fifteen hundred and seventy-five varieties of other fruits. Mr. Downing's gift included, also, the fourteenth edition of the "Fruits and Fruit Trees," with manuscript notes and corrections by him, and the "North American Pomologist," by Dr. William D. Brincklé. The thanks of the Society were voted to Mr. Downing for his valuable donation, and the Secretary was directed to communicate the same to him.

Adjourned to Saturday, February 11.

MEETING FOR DISCUSSION.

HARDY HERBACEOUS PLANTS AND THEIR CULTURE.

The first speaker was Joseph H. Woodford, who thought that the argument advanced the week before by Mr. Moore against the deep digging of borders, when little or no manure is applied, was rather in favor of the practice. He wanted to continue the growth of herbaceous plants through the season, and if we can do this by deep digging, we can get flowers through the season. The object of the plant is to perfect its seed, but we do not cultivate it for its seed, and if we can keep it from perfecting its seed, it will bloom all the season. This is the principle on which the practice of cutting flowers to prolong the bloom rests.

John B. Moore said that Mr. Woodford had advised those who

had not manure to dig their borders deeper, but the speaker asked, if you have a border of perennials, why let it go without manure? The true way is to dig deep and manure well also, and not to set out plants and expect them to grow without anything to feed on. The statement which he made last week, as to the effect of deep ploughing on corn and other farm crops, is correct. He had said nothing against deep digging if the ground is manured. The object of deep digging is to give room for roots and provide moisture. Herbaceous plants must have plenty of water, like roses. The subject under discussion is not the alternative of deep digging without manure, or shallow digging with manure, but the best method of culture. Any one who can afford to plant a border of perennials should afford to feed them. Plants are like animals: they cannot be expected to grow without anything to feed on.

Josiah W. Talbot asked whether perennials did not need rest, and whether they should not have time to ripen their buds.

J. W. Manning said that his borders are dug two feet deep, and that the plants ripen. The *Dielytra spectabilis* is one of the plants which bloom a second time when cut back; unless transplanted once in two or three years, it is apt to dwindle and finally die out.

P. B. Hovey said that deep digging is the foundation of all good culture. He would rather have the ground trenched two feet deep without manure than to have it dug shallow with manure. In England gardeners trench the ground every year for almost every crop.

John C. Hovey thought Mr. Moore was right in saying that water is the great thing in the cultivation of herbaceous plants. He would dig the ground eighteen inches deep, and give plenty of water. Some plants, like the Trillium and Pæony, cannot be made. to flower continuously, while the Phloxes and Clematis can There are not twenty herbaceous perennials that will give late bloom to amount to anything.

John G. Barker thought that herbaceous plants have not received the attention they deserve. The previous speakers have been all correct in the main, but not all have the same way of getting at the point. At Pine Grove Cemetery, in Lynn, of which he is Superintendent, he had been compelled to give attention to something more enduring than bedding plants. A place was

selected for a border of perennials, where they did not want to put bedding plants; the soil was a loam of fair quality, about twenty inches in depth. This was trenched and mixed with well decomposed manure, and covered with loam. In the back part, Josika Lilacs, Deutzias, and other shrubs were planted, and in front of them *Hydrangea paniculata grandiflora* in groups. The spaces between these were still more enriched, and Castor-oil Beans planted, which gave the bed a sub-tropical appearance. In front of these were Phloxes, Japan and Tiger Lilies, *Lilium superbum*, etc., and still further in front Aquilegias, and plants of similar growth. The soil was naturally moist, and care was taken to give plenty of water, especially to the Phloxes, and it was one of the most satisfactory beds on the place. Other beds prepared in the same way, but where no water could be given, showed a vast difference. When the bed described was in its beauty, the Hon. E. R. Mudge called to confer with Mr. Barker in regard to arranging the grounds around a church, and said that he had no idea so much beauty could be produced with herbaceous plants. Mr. Barker said he meant to extend this bed, and make it more attractive, and he thought the time would soon come when herbaceous plants would receive more attention generally, and we should see fewer bedding, and more hardy, plants, or combinations of both. Much may be done with herbaceous plants in parks and cemeteries; if named collections should take the place of a part, at least, of the bedding plants in the Public Garden, they would be more attractive and interesting. The speaker alluded to the beautiful beds and great variety of herbaceous plants in the grounds of the President of the Society.

Mr. Barker read from an article by William C. Barry, in the "American Rural Home," as follows: "For nearly a month our garden borders have been enlivened with the beautiful and showy blooms of the Herbaceous Pæony. Planted among conifers, flowering shrubs, and ornamental trees, their gay-colored flowers produce a charming effect. On our ground we have a border two hundred feet in length and fifteen feet in width, which contains a choice collection of ornamental trees, conifers, shrubs, roses, pæonies, and hardy border plants. The tall-growing trees form the background; the shrubs and trees of medium size come next,

with the pæonies, roses, and border plants in the foreground. The assortment of pæonies, when in flower, is undoubtedly the most interesting feature of the collection. On our nursery grounds a large circular bed, about twenty feet in diameter, planted with the most showy and distinct varieties, has, during these beautiful June days, attracted great attention. It is surprising that so noble a flower, almost rivalling the rose in brilliancy of coloring and perfection of bloom, and the rhododendron in stately growth, should be so neglected. . . . The foliage is rich and glossy and of a beautiful deep green color, thus rendering the plants very ornamental even when out of flower."

Herbaceous plants are interesting from early spring until the frosts of Autumn, and, unlike bedding plants, always afford flowers for cutting. If this subject were properly placed before the people by the Society, and by local horticultural and village-improvement societies, it would inform the owners of small places how to permanently beautify them. The speaker had read of pegging down the shoots of Phloxes, and of flowering shoots breaking from the whole length like roses. He recommended as among the most desirable herbaceous plants for beginners, *Aquilegia chrysantha* and *A. cœrulea;* the Alstrœmerias, which are grand plants; and *Anemone sylvestris*, very desirable for spring, and *A. Japonica* for autumn flowering. The native Asters are very beautiful under cultivation. *Bocconia Japonica* is well suited to the back of a border. The Campanulas, Delphiniums (Larkspurs), *Dielytra spectablis*, *Gaillardia grandiflora*, Hollyhocks and Phloxes, the Double Pyrethrums, and *Spiræa palmata*, are all excellent. The *Funkias* are very desirable. The Fraxinellas are old, but desirable. The markings of some of the Irises are as rich as many of the Orchids. *Iris Iberica* is particularly beautiful. A bed of Irises and Lilies edged with Hepaticas looks well, or Moss and Hybrid Perpetual Roses edged with *Myosotis dissitiflora*, and with these spring flowering bulbs may be planted, which bloom before the roses, and would not injure the other plants.

Charles M. Hovey said it is important that herbaceous plants should have rest. Corn is grown for the seed, but the plants under consideration for their flowers. They need good culture and a soil that will hold moisture, and particularly a moderately

deep soil. If the soil is too rich the buds at the base of the stalks, which are to produce the next year's growth, will be immature. Mr. Hovey said that he was glad to know that Mr. Barker's estimation of the Pæony agreed with his own, and also to hear Mr. Barry's opinion. It is only since the introduction of the Coleus, Alternanthera, and Variegated Pelargoniums that ribbon gardening has grown up, but we must rely on herbaceous plants as much as ever if we want flowers early in the season. He had endeavored to impress on the public the importance of planting them, and he hoped the public would appreciate them. They are especially adapted for cemeteries. He would not do away with bedding plants altogether, but would have them in a place by themselves. There is no time when you cannot cut a bouquet from a perennial border. Herbaceous plants can be raised with little expense; two dollars worth of seeds will give a mass of bloom in two years. Some are so hardy as not to need protection, but for others a little covering, such as leaves or strawy manure, is necessary, especially for those newly planted, which might otherwise be thrown out of the ground by the frost. Among native plants the Trillium and Sanguinaria are particularly desirable.

Mr. Barker said that he protects his borders with compost in autumn, and forks it in in the spring. He spoke of the fine effect on a wall about sixteen feet high, covered with *Ampelopsis quinquefolia* and *A. Veitchii*, and of the contrast of the deep blue flowers of Clematis Jackmanni with the foliage of the Ampelopsis. It has been objected to herbaceous plants that they are not as easily arranged as some others; but if thought is given to the matter, good effects can be produced.

John C. Hovey said that the vitality of herbaceous plants is so great that people think when they are once planted they need no further care; but he had found, and Mr. Parkman's experience had been the same, that they must be constantly divided. He had taken up Delphiniums, and, after dividing them, had replanted them in the same soil, and they had done well.

E. H. Hitchings expressed surprise that more attention was not given to the cultivation of native plants. Like Mr. C. M. Hovey, he had noticed the tiger lily planted to the neglect of the far

more beautiful *Lilium superbum*. He had seen the latter growing wild, eight feet high, with from fifteen to twenty flowers on a plant. He agreed with Mr. Hovey that the *Asclepias tuberosa* is one of the most desirable of all our native plants. Some of the Golden Rods are very handsome when cultivated; *speciosum*, *sempervirens*, and *rigida*, are among the most eligible species. The native asters — *undulata*, *longifolia*, and others — are also desirable. *Claytonia Virginica* and *C. Caroliniana* flower from the middle of April to the last of May; both were cultivated by the late Minot Pratt. *Silene Pennsylvanica* is very handsome; the speaker once found a plant with seventy blossoms and one hundred and seventy-three buds. It was admired so much by Dr. Bigelow that he requested Mr. Hitchings to set out some plants around his lot at Mount Auburn. *Cypripedium spectabile* is one of the handsomest native orchids, and succeeds under cultivation with very little trouble.

A lady inquired the scientific name of a flower which she had seen under the name of "Evening Glory." From her description it was recognized by John C. Hovey and Mr. Barker as *Ipomœa grandiflora*. Mr. Woodford had seen it in Bombay, and brought home the seed; it is very fragrant and very desirable, but hard to keep over winter. Mrs. E. M. Gill had received seeds from Georgia, which would not vegetate until scalded. John C. Hovey said that when planted one corner of the seed should be cut off and the cut placed downward. President Hayes had seen masses of it in Texas, covering the negro shanties, and brought home seed, but lost it.

A gentleman, whose name was not ascertained, spoke of the different treatment required by soils of different character. The great point is to provide a supply of water, which is the life-blood of plants. Water comes both ways, by rain from above and by capillary attraction from below; and, if we understand this principle, we can judge whether a soil will be benefited by trenching. If the natural supply of water is small, and the subsoil is clayey or hard, so that it is difficult to draw water from it, then it needs to be deeply pulverized; but if it is loose and gravelly, it should not be. If the surface is kept loose in dry weather, it not only acts as a mulch to the portion below, and prevents the escape

of moisture, but, if stirred towards night, the light and porous portion absorbs air, which gives off its moisture to that below. All soils should be kept porous on the surface. When plants get plenty of water, it is easy to supply everything else, but without water you can get nothing.

Notice was given by the President that the subject for the next Saturday would be the "Cultivation of Garden Vegetables."

BUSINESS MEETING.

SATURDAY, February 11, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee, appointed October 1, 1881, to consider what acknowledgment should be made to Charles O. Whitmore, for his valuable services to the Society, reported as follows: —

The Committee to whom was referred the recognition of Mr. Charles O. Whitmore's services on the Finance Committee of this Society, report the following Resolves: —

Resolved, That in consideration of the eminent services of Charles O. Whitmore, Esq., as Chairman of the Finance Committee for Fifteen Years, from which position he has retired at his own request, the thanks of this Society are due, and are hereby gratefully tendered to him.

Resolved, That these proceedings be suitably engrossed, signed by this Committee, countersigned by the President and Secretary, framed, and presented to Mr. Whitmore as a testimonial of the regard entertained for him by the members of this Society.

MARSHALL P. WILDER,
WILLIAM GRAY, JR.,
CHARLES H. B. BRECK,
} *Committee.*

The report was unanimously accepted.

Adjourned to Saturday, February 18.

MEETING FOR DISCUSSION.

The following paper was read by the author:—

Vegetable Culture.

By William D. Philbrick, Newton Centre.

Mr. President, Ladies, and Gentlemen: —

It is only a few days since that I received a request from our worthy Secretary, in behalf of the Committee on Publication and Discussion, to open this meeting with a few remarks on the culture of garden vegetables; and I trust that you will pardon me if I have found time to gather up, at this short notice, very little that is worthy of your attention. Indeed there is, as Solomon said, "nothing new under the sun."

The routine of market gardening has made few changes lately; one of these, however, is worthy of notice. I refer to the recent use of greenhouses at Arlington and Providence, R.I., for raising lettuce plants, which are transplanted to hot-beds for heading up. The lettuce does not head so well in the greenhouse as in the hot-bed, but the greenhouse is easier to manage, and will grow excellent plants, which will head up in a hot-bed in from six to eight weeks in winter after setting, and it has been found a very great help in getting the hot-beds working early, to have a good supply of plants grown in the greenhouse. If any one should ask why we cannot head the lettuce as well in a greenhouse, I suppose the answer must be sought in the difficulty of maintaining an even temperature in severe weather, in the cold drip from the frosty glass, and in the excessive dryness of the air of the greenhouse in bright sunshine. The hot-bed, being covered at night, preserves a more uniform temperature, has no frost on the glass to cause a cold drip, and when aired is not so dry, owing to the nearness of the glass to the plants. Possibly a covering for the greenhouse could be devised that would overcome these difficulties, and make the greenhouse lettuce as good as that produced from hot-beds. Mildew continues to be one of the worst obstacles in raising good lettuce. The only remedy seems to be to keep the lettuce growing as rapidly as possible, so as to outgrow the mildew; but this rapid growth is incompatible with forming a good solid head.

Mushroom culture has attracted considerable attention, and several of our members have been quite successful in producing this delicious fungus in the depth of winter. A cellar heated by a stove or boiler to 60° or 70°, with close, damp air, seems to be all that is required, except skill in handling the manure and spawn.

Some of the gardeners have lately been in the habit of growing seeds of early cabbages and celery in one year from seed. This is done by starting seed very early in winter in the hot-bed or greenhouse, and thus getting a mature plant early enough to ripen seed the same year. I am inclined to think that this method has resulted in developing in the celery a habit of running to seed in one year, — very troublesome to the grower, and it certainly prevents the grower of cabbage seed from making such careful selection of the best heads as is desirable in growing the best seed.

There seems to be a prevalent feeling among the public at large that gardeners made their fortunes last year, because every garden product commanded unusually high prices. Nothing could be further from the truth. The high prices were the result of very bad crops; and very few reap any benefit from them. The season of 1881 was one of very uncommon changes, of frequent cold rains, and very severe frost early in October, all resulting in unusual loss to the farmer and to the consumer as well, — the latter being forced to pay very high prices for his supplies. The present high prices will probably stimulate the planting of a very large area of crops the coming year, and, if the season should prove productive, prices will very likely drop to the opposite extreme. Thus, one extreme usually follows another, both in our markets and in our weather.

Such seasons as the one just past are useful in teaching the importance of thorough culture and perseverance in garden work. Those gardeners who persistently planted their melons and cucumbers over and over again, some of them four times in succession, were at last rewarded with a fine crop in September upon a very quick market. The poorly-tilled, half-tended cornfields hardly produced enough to pay expenses, while those thoroughly worked were unusually profitable.

I shall be very glad to answer any questions that I am able to, that may occur to any one present to ask.

DISCUSSION.

Mr. Philbrick added that the greenhouse has the advantage over the hot-bed, that when the lettuce is troubled by lice they can easily be destroyed by smoking, while a plant infested by lice in a hot-bed is worthless. It is well known to lettuce growers that twenty years ago there was very little trouble from mildew. Then lettuce was grown very slowly; but now it must be grown rapidly to escape mildew, and then it does not form so solid a head as if grown more slowly. The market for the lettuce grown here is found chiefly in New York. This may appear strange; but it has been so for twenty years, and the business is increasing, — one grower using fifteen hundred sashes, besides greenhouses, and several growers a thousand sashes each.

It is well known that the cabbage and celery are biennial; but taking two seasons to raise seed is too slow a process for some impatient gardeners, who have started seed at about Christmas, and get cabbages almost ready to head before setting out. But, as before observed, this probably has resulted in a habit of running to seed in the first season, which is very troublesome when the plants are grown for the table. Last year, in the dry weather, lettuce ran up to seed.

George Hill said that, as it was coming time to start hot-beds, he would give an account of his method. Some good ground should have been selected last autumn, and a fence six feet high erected to shelter it on the north. It should be ploughed several times, as late as possible; and if ploughed when partly frozen, it will be the better pulverized. The ground should be covered with litter to keep it from freezing. A short time before it is intended to start the hot-bed, the frames are put down and the sashes put on and covered with wooden shutters; but mats are not used until after the plants are in. The stable manure used must be as fresh as possible. It should be covered with about eight inches of soil, which should be in good condition in the fall. For seeds, less loam is necessary than when plants are set out, but enough should be used to absorb the gas arising from the manure, which causes mildew. Four dozen lettuce plants are placed under each sash. With sufficient heat air can be given night and day, and the gas let off. It is not necessary to water yet, but when water is given it should

be warm, as cold water increases mildew. The speaker warms water for this purpose by passing it through a coil of pipe in a boiler. Houses are better than hot-beds during the short days, because they afford more light; but after the end of January hot-beds are preferable, for the heat is more steady and the air more congenial. Dung heat is best for flowering plants, and also for cucumbers, which latter are as delicate as any grown. The bottom heat should be sufficient in February and March to air the frames night and day. Too much air causes mildew and blight. The sashes should be raised about two inches at the back. He had been in rose and cucumber houses where the plants seemed to be affected with a scald similar to that of the lettuce. He attributed it to the gas arising from an excessive quantity of fresh manure.

Josiah Crosby said that if the growth of celery plants is checked, when they start again they are disposed to go to seed. When he thinned out seedling celery plants, few of those transplanted went to seed, but many of those left did. He did not approve of raising celery seed in one year, though he could not say that it is not safe.

E. W. Wood had found it easier to grow lettuce in houses than in frames; but it is more apt to "slough off" than in frames,— that is, to turn black, beginning in the centre, and gradually extending, and making the lettuce worthless. He asked if any one could give the reason of this trouble. Dealers say the lettuce is sunburned. He saw it in Mr. Philbrick's house, two hundred feet long, — a lean-to running east and west. The sash-bars of Mr. Wood's house are six inches wide, and when the sun is low its rays do not fall directly on the lettuce, which is ten feet from the glass. If this difficulty can be overcome, it will be easier to raise lettuce in a house than in a hot-bed; for it is much pleasanter to work in a house than about frames when the snow-drifts are higher than the fences.

C. M. Hovey thought that any lettuce ten feet from the glass, would be diseased. The chief difference between the houses and the frames is that in the latter it is not more than from six to ten inches from the glass, and, if covered with snow for a few days, it does not suffer much. The trouble is not scalding, but the plants are not strong enough, and are too far from the glass. A certain

amount of heat must be maintained in houses to keep out frost, and this dries the air, which the lettuce does not like. He did not think that as solid lettuce could be raised in houses as in frames; but it is more difficult to keep up the heat in frames during mid-winter.

Mr. Hill said that in December and January, when the sun is very low, you can get better lettuce in houses than in frames, but after January in frames. Mr. Hovey thinks that as good solid lettuce cannot be raised in houses as in frames; but the speaker had grown plants in frames, and when about to reap the fruits of his labors cold weather came and it was impossible to keep up the heat. From the time the days begin to lengthen, seeds, bulbs, and plants show it; an amaryllis which at Christmas did not show a leaf, had them all peeping up on the 10th of January. He had known celery injured by excessively hot weather in September. When the thermometer rose to 100°, on the dark day last September, lettuce wilted.

Hon. Marshall P. Wilder asked if the greater part of the lettuce sent to market is not raised in frames.

Mr. Hill replied that, up to this time, most of it is raised in houses, but after this in frames. There has been but little good lettuce in the market this year, while it has been glutted with that of poor quality. He thought the greater part of the second quality came from houses. He agreed with Mr. Hovey that the trouble known as "sloughing off" is not burning. In hot weather lettuce burns in frames if the grower is not careful. Nine out of ten grow it too fast, and then in cloudy weather it becomes weak, and when the sun comes out it burns. He was unable to say whether houses or frames are cheaper; but he has visited most of the growers, and thinks a man could get a living out of hot-beds best. In running houses the depreciation has not been considered. With frames, the cost of shovelling snow, wear of mats, etc., must be taken into account. He extends his cultivation in the old way. Stable manure gives the cheapest heat, and bottom heat gives the evenest temperature.

Mr. Hovey said that lettuce must be grown in a low temperature. There is no house where the glass will not be frosted with an outside temperature of fifteen degrees when the wind is

blowing, or zero when the air is still, and this frost falls in the form of snow on the lettuce, and may cause the sloughing off complained of. Violets, which require the same treatment as lettuce, are affected in the same way; the top leaves begin to damp off. The injury shows when the sun comes out; but the sun is not the cause.

Mr. Hovey gave an account of his success in forcing cucumbers in 1832, in a brick pit, with a chamber beneath for the dung, which supplied heat. The seed was sown on the 28th of January, when the thermometer was eight degrees below zero. He kept an exact record of sales and of the length of every cucumber. Those sold amounted to thirty-eight dollars, and he had also enough for his own use, from a three-light frame. Many of the cucumbers measured from ten to thirteen inches in length, and some of the leaves were fifteen inches in diameter. The highest price received was twenty-five cents. The variety was the Southgate. The soil was almost wholly leaf-mould, with a very little loam. The leaves covered the bed so completely that not a fruit or a flower was to be seen. He has never seen such a bed since. In England cucumber growing is considered the test of a gardener's skill. There is nothing like manure to grow plants; it not only affords heat, but ammonia, which is taken up by the leaves. In England it has been suggested to scatter guano in orchid houses to afford food for the plants. The speaker also raised the first violets in New England, and has never seen such ones since. To meet with such success, the best appliances in the way of frames, shutters, etc., must be used. Mr. Hill is partially correct in regard to rose houses; too much crude manure brings on mildew. Plants want moisture, but not in excess, and air must be let in most carefully, raising the sashes not more than an inch at a time, or mildew will be the result.

Mr. Wilder said that the subject is narrowed down to the fundamentals of air, light, moisture, and heat; but eternal vigilance must be exercised in administering these. It is impossible to contend with such snow-storms as we have had this winter. He has a propagating pit warmed by flues underneath, from which he gets a supply of cucumbers six months in the year. The young plants are now in pots, and in a few days he will place two pots

underneath each sash. The plants, when large enough, are trained on the roof, and the fruit averages over a foot in length. He is very fond of melons, and takes extraordinary care of them, and tries every new kind. He makes large hills early in the season, digging holes three feet broad and filling with rich compost; a frame about two feet square is placed over each hill until the soil is warm, and then the seed is planted, and he is always successful. Mr. Hovey is right in thinking that plants feel the increase of light after the winter solstice, even when the days are growing shorter in the morning. They have learned that the sun is returning.

Mr. Wood agreed with Mr. Hovey that we want to get at facts; but Mr. Hovey had not hit the point we are aiming at. Some lettuce in houses is as good as any, and the conditions which grow part healthy, will grow all so if we can only find out what they are. The trouble is not the distance of the plants from the glass; for, if it has light, lettuce is never drawn. Mr. Comley has shown good lettuce from a house twelve or fourteen feet high. Houses for growing lettuce have been introduced only a few years, and our experience with them is limited. Small plants are not affected.

Mr. Philbrick's experience had been the same as Mr. Wood's; he gets some lettuce from houses as good as any in hot-beds, but not as large a per cent., and he cannot discover the cause. Mr. Hovey's and Mr. Hill's suggestions are good. Lettuce needs light; it grows too tender in the dark. The trouble complained of is called sunburn because it is noticed just after sunny days; but the cause operates on dark days, making the plants so tender that they will not endure the sun. He has never seen it on small plants. He uniformly gets the best lettuce in houses where it is farthest from the glass, — say four and a half feet.

Mr. Hovey said that in Mr. Philbrick's house the snow was melted in the highest part before falling. In England certain plants must be put near the glass. Primroses cannot be well grown ten feet away; they should not be more than from twelve to fourteen inches. Pelargoniums and *Euphorbia Jacquiniflora* flourish best near the glass. He gave this as his theory of the cause of the trouble.

Mr. Hill asked if half of what is called burning is not wilting.

Mr. Hovey replied that it is. Camellias burn, but that is very different from the affection of lettuce. It is owing to the tender condition of the leaf, which becomes chilled so that the tissue is spoiled, and if the air is not moist it will dry up. He had seen callas affected in the same way; and if the new growth of bouvardias touches the glass it will freeze and wilt, and must be tied away to prevent this.

John B. Moore said we had heard hardly anything about outdoor culture of vegetables. For this, the thorough pulverization and preparation of the soil is very important; you cannot raise good vegetables without it. Jethro Tull claimed that with it there was no need of manure; but his system failed. You cannot deplete your soil and have it retain its fertility. Pulverizing is important in connection with a sufficiency of manure; if that is supplied, constant hoeing will make better crops. If the surface of soil is finely pulverized it increases its nitrogen by absorbing it from the air. No chemist of much reputation will dare to assert now that plants absorb nitrogen through their leaves; they take it in the form of nitric acid or ammonia through their roots. He did not believe in manuring plants by throwing round a little guano to give off its nitrogen for plants to absorb from the air.

Aaron D. Capen said that we had all been instructed here today; but some of the discussion had been higher up than many of our members could go. He could pick out gentlemen who are always successful with their crops; but he could not himself avoid missing sometimes. No one has told us today how to prepare the soil for hot-beds, or how much manure and other material should be put in. He puts half an inch of sand into his hot-beds. He mixes sand and pulverized manure and has always been successful. It makes the soil lighter.

Mr. Hill said that ten or twelve inches of manure would raise a crop of lettuce in the coldest weather. He sometimes top-dresses a bed, but turns the dressing under before planting. The more heat spent before the manure is used the less there is left for the hot-bed. If beds are going to be covered, he leaves them open an inch. More injury is done by too much than by too little heat, and more plants are killed by kindness than in any

other way. If convenient, he would put an eighth of an inch of sand on the surface of the soil in his hot-beds.

Josiah W. Talbot asked if the Arlington soil (where Mr. Hill's grounds are) is not naturally sandy.

Mr. Wilder said that any good garden soil on top of ten or twelve inches of manure is sufficient. It will absorb the ammonia which escapes from the manure, and constitutes one of the most important elements in the growth of plants.

C. C. Shaw stated that in 1879 and 1880 his squashes were destroyed by an insect, and on examination he found a maggot at the root, and asked how to prevent this loss.

Mr. Hill said that the only remedy is to destroy the fly that lays the egg from which the borer is hatched, or to cut out the borer. If ashes or any similar substance is placed round the root to keep them away, they go to the next joint.

The Committee on Discussions announced that the subject would be continued on the next Saturday, with special reference to the Out-Door Culture of Vegetables.

BUSINESS MEETING.

SATURDAY, February 18, 1882.

An adjourned meeting of the Society was holden at 11 o'clock. President Hayes in the chair.

The President, as Chairman of the Executive Committee, reported the List of Prizes to be offered for Essays, by the Committee on Publication and Discussion, with the approval of the Executive Committee.

FRANK S. COLLINS, of Malden, and
EDWARD BURNETT, of Southborough,

having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

H. J. VEITCH, of Chelsea, England,

was, on recommendation of the Executive Committee, elected a Corresponding Member of the Society.

Adjourned to Saturday, February 25.

MEETING FOR DISCUSSION.

The Out-Door Culture of Vegetables.

William D. Philbrick was first called on, and said that success in the out-door cultivation of vegetables depends chiefly on plenty of manure, and on keeping the ground light by thorough tillage, but more than anything else on sowing good seed. Where land is valuable two or three crops are raised in one season, and sometimes even four, but in that case the first crop is early spinach, which is sown the autumn previous. It used to be the custom to sow tomatoes at about this time of the year, and transplant two or three times, but now it is thought that they can be raised just as well if planted the 10th of March. When finally set out, which is done about the 20th of May, they are placed four feet apart. The Paragon is one of the best varieties; it is a rank growing kind, and needs a good deal of room, — six feet by four on good land. The Lima bean is one of the best and most delicate and tender of vegetables. There is some difficulty in getting the seed up. It should be planted with the eye downward, otherwise the young root and top are hindered in their growth, especially in a heavy soil. They are frequently planted too early. They should not be planted very deep — half an inch is sufficient. Celery, which is coming into so general use, is very delicate, and very troublesome. It requires more care and more nice work than any other vegetable — from the first of April to the same time the next year. Formerly it was sown in hot-beds, but the best gardeners now sow mostly out-doors. The soil should be very rich and mellow, and the seed should be covered very lightly. It is better to transplant it in damp or even rainy weather. If transplanted in sunny weather it should have a ball of earth to each plant, and should be well watered; but the market gardeners turn out in rubber coats and plant in the midst of rain. The summer culture is very troublesome; it grows very slowly, and must be weeded by hand. Formerly it was planted in trenches, but now on level ground, the rows seven feet apart, and the plants a foot apart in the row. The earliest should be banked up in September, to blanch it, about three weeks before selling. The late crop does not require to be

earthed so soon. For late keeping it is sometimes placed in a hot-bed frame, and sometimes in a pit made for the purpose. The outside leaves are taken off, and it is heeled in as closely as possible about the 10th of November. It should be blanched before putting into the pit, but not as much as if it were to be sold immediately. Boards are placed over the pit, and covered with litter or tan. There should be a shutter every thirty feet for a man to get in. It must have a little air, but not too much warmth; as near freezing as possible without freezing is best. The pit should be deep enough to have a space of six inches between the celery and the boards, and should be covered with tan or litter to the depth of one or one and a half feet. The pit must be made in a well-drained place, and the cover should be slightly inclined, but a little water from above does no harm.

O. B. Hadwen said that since vegetables had come into our markets from the South so freely, and were sold so cheap, it had not been profitable for him to raise early vegetables; but he had not forgotten the principles essential to their culture. He gave an account of the gardening operations of a friend, who was formerly a successful merchant, and who has carried on to his farm the same energy as he showed in his mercantile business. The luxuriant growth of fine vegetables on this farm was such as the speaker had never seen before. There were all kinds, and all were flourishing. The method of culture was simple but effectual. The ground, which was of a sandy nature, was trenched three feet deep, to get moisture, and manure was incorporated with it at the rate of a hundred cords to the acre. In the melon-bed the fruit was so thick that there was hardly room to set foot, and was of exquisite flavor. Strawberry plants, set out on the 1st of August, were, many of them, as large on the 20th of September as a peck measure, and the foliage was three times the ordinary size. Though three by two and a half feet apart, they nearly covered the ground the next season. Mr. Hadwen thought it extravagant to apply so much manure; but when he saw the results he began to comprehend that it was profitable. A hundred strawberry plants, set out in the autumn of 1880, produced in 1881 seventy-nine quarts of fruit, many of the berries weighing from an ounce to an ounce and a half each. Many of the varieties were the gentleman's own seedlings.

Celery, corn, tomatoes, and other vegetables, were all in the same proportion. He raised some very nice lettuce. Eight or ten years ago he bought the best lettuce seed he could find, and since then has raised his own seed, selecting twenty of the best heads to save for seed, and out of that selecting the best one. His seed-corn is selected with equal care. The strawberry plants from which he intends to raise seed are set out a long way from any others, and the pollen is carried to them on a brush. When he first went to farming his neighbors saw in him a city man, such as they like to laugh at. He hired help to plough three feet deep, and when he had gone as deep as he could with a plough, he put men into the trenches to throw up the soil, and his neighbors have not laughed at him much since they have seen the results of his tillage. High culture is most satisfactory to gentlemen who desire the best results, and any one with the same intelligence and care in raising seed, can produce equally good results.

Mr. Hadwen said that by planting the seed and stem ends of the Early Rose potato separately, he could, in a few years, produce two varieties, differing two weeks in time of maturity; or, by selecting the round and oval potatoes, he could, in a few years, get two varieties possessing the same characteristics.

President Hayes suggested that Mr. Hadwen should get liberty to mention the name of his friend, and induce him to prepare an essay for one of our meetings, or to attend and answer inquiries.

Leander Wetherell remarked that to apply manure at the rate described would hardly be profitable if it cost as much as in the Connecticut River Valley, where farmers have paid fifteen dollars per cord.

Aaron D. Capen thought that cabbages, tomatoes, and other vegetables, could be transplanted as easily in dry weather as in moist, if a cavity were left round the plant, and water poured in and covered with soil. Somebody has said, "there is such a thing as hoeing vegetables too much, but cabbages may be hoed every day with benefit." Mr. Moore struck the key-note last week when he spoke of the thorough pulverization of the soil. The speaker would manure and plough in the autumn for squashes, and then the manure would compost all winter. In the spring he plants his potatoes in furrows, and when it is time to cultivate, he ploughs

the earth away from them, leaving only a strip in the middle to be hoed; the next time he ploughs the other way. He plants squashes in drills, like peas, and when they are up ploughs the earth away from them and thins out with the hoe. When they are larger he throws the earth toward them in ploughing. This method saves half the expense of cultivation, as it avoids ploughing more than one furrow at the time of planting. He knew a gentleman in Middlesex county who grew a fine crop of potatoes with very little labor. He planted in drills, and covered with a plough. Before the sprouts of the potatoes came to the surface he levelled the ridges with a harrow, and destroyed the weeds when small. When the plants were sufficiently grown he used a cultivator, and no other implement was used until the crop was harvested. He then grew a fine crop of celery on the same ground.

Benjamin P. Ware said that the subject before the meeting was a very wide one. He was more familiar with field than with garden culture, and had found that the most important matter in raising vegetables is to have good seed, but it is not fully appreciated. The cabbage crop is of very great importance in Marblehead, where the speaker resides; indeed, at a farmers' discussion it was decided to be the most profitable farming specialty in the town. One reason for this is the great care taken in growing the seed. He thought that forcing it to produce seed in one year was not calculated to improve its quality, and would, in a few years, result in making it an annual. In selecting plants for seed, the grower starts with the idea of a perfect cabbage in his mind, and selects two or three dozen of the best of his crop, and from those, two or three which approach most nearly to his ideal. These are cultivated with great care, and in a few years the ideal is reached. The Marblehead Mammoth was produced in this way. The originator was ambitious to produce a large cabbage, and succeeded, and raised very heavy crops; but as they were sold by count, and there were only a hundred and twenty-five in a two-horse load, the result was not very profitable. Mr. Ware recommended it only as a curiosity. He grows only "thorough-bred" cabbages — breeding is as important in vegetables as in animals. With such seed almost every plant will produce a fine head. He has seen cabbages with stalks two feet high. There is much seed in the

market, which is grown without any selection, and even from refuse cabbages, and not only of cabbages, but of onions, and all other vegetables. Last year one of the best onion growers in Marblehead, whose seed-plot was partly destroyed by a hail-storm the year before, prepared his ground and planted all the seed he had of his own raising, and for the remainder bought the best seed he could find in Boston. Afterwards the seedsman of whom he bought it inquired how it proved, and the grower answered that it would have been better for him to pay twenty dollars a pound for seed like his own than to have such seed as he bought given to him. The seedsman, who had honestly intended to sell good seed, was so surprised that he went to Marblehead to examine the crop, and candidly acknowledged that the grower was right. What is true of onions and cabbages in regard to seed, is true of other vegetables. With good seed you must also cultivate well; but with the best cultivation and manuring, and poor seed, you will get poor crops.

William C. Strong asked whether it would pay to grow cauliflower seed in this country. It is generally imported, and the results are not satisfactory.

Mr. Ware thought it would pay, though he is not a large grower. We may make our ideal of almost any vegetable a reality, just as easily as we can in breeding pigeons.

Mr. Philbrick said that some cauliflower seed is already raised in this country very successfully, and he did not doubt that in a few years we should raise all that will be wanted here. It is an annual, and our seasons are not long enough to mature the seed unless the plants are forwarded in a hot-bed. The best heads should be selected for seed. It is more important to transplant celery on a rainy day than it is other vegetables.

Hon. Marshall P. Wilder said that nobody doubts the importance of manure and thorough pulverization of the soil, or of deep trenching for some crops; but others want breadth rather than depth. Formerly it was thought that asparagus needed a deeply trenched soil, but now a foot of soil, with the manure near the surface, is deemed sufficient; but the roots are set further apart, say from three to four feet, and they will then occupy the whole of the ground. Few are aware of the distance to which roots will

extend in good soil. Strawberries which the speaker planted in an old dahlia bed, deeply trenched, were found to have sent down the roots to the depth of three feet. He cares but little whether the weather is cloudy or sunny when he sets out strawberry plants; he puts a quart of water into each hole when it is nearly filled, and then covers it up with finely pulverized soil.

Mr. Wilder spoke of a farmer near Boston who raises seventy-five thousand cauliflowers in a year, and does not believe in chemical fertilizers; but he keeps a stock of more than two thousand animals. Who would believe in chemical fertilizers if he could have such a quantity of manure as these animals would produce?

Clark W. Mills, of Pompton, New Jersey, said he was not one of the æsthetic, high-art farmers, but had some knowledge of general laws and treatment. There are but three retainers of fertilizing properties, — clay and carbon in the soil, and water everywhere. When ten tons of grass are cut off an acre the water is evaporated until perhaps only a ton or a ton and a half is left, consisting mainly of woody fibre and gum, worth perhaps less than a ton of what was evaporated, for with the water went the condiments which make fine flavored butter.

When what is called the pure rain comes down, it washes from the air all the ammonia which has emanated from the sewers and elsewhere, and if the hard pan at the bottom of the tilled part of soils is broken up so as to let the water through freely, it gives up its fertilizing matter to the clay and carbon in the soils. The failure to understand the loss of nutritious matter in drying grass has been a great loss to farmers, who have wasted nine-tenths of all they have raised. No business man could ever succeed in this way. The speaker would preserve food for cattle, not by taking away the water, but by excluding the air. He would not have it crushed or bruised by trampling, but would exclude the air by continuous pressure, — about three hundred pounds to the square foot is sufficient. In this way the food will be perfectly sweet, instead of having passed into the acetous fermentation. The pit in which it is preserved should be long and narrow, so that what is wanted can be cut off from time to time without exposing the remainder unnecessarily to the air.

Charles M. Hovey said it is immaterial at what time vegetables

are transplanted, provided that they are not too large, and that the ground is warm and mellow; but he would never transplant in a rain-storm when the ground is puddly. The ground should be warm and mellow, though not perfectly dry, and then the heat sets the roots in action immediately. He had pulled up in the morning, plants set out the afternoon previous, and found the young rootlets already starting. In setting strawberries or other plants by the acre or ten acres, it would be too much work to carry a quart of water to every one, though it might easily be done in a small garden. When the grower gets only from six to ten cents per quart for his strawberries, he must raise them cheaply. He could not afford to manure highly, — even at the rate of twenty-five cords per acre, when they are grown so cheaply at the South, though those raised here bring more. Mr. Hovey agreed with the previous speakers as to the importance of good seed; and said that it was well to impress it on all, but that people are not willing to pay for good seed. A seedsman would be thought insane who should ask twenty dollars per pound for onion seed. The mass of cultivators cannot raise their own seed, and seedsmen generally try to have the best seeds. The European growers who hybridize pansy and other flower seeds rarely sell it, but reserve it for the production of new varieties.

Mr. Strong remarked that Mr. Moore, of the Committee on Discussion, had been very successful in raising cauliflowers, and that Peter Henderson advertises seed which will produce plants uniformly heading.

John B. Moore said that in making changes and raising specialties he had given up growing cauliflowers, but as long as he continued it he used Italian seed. Henderson's is good. The largest grower in this vicinity raises the Half-Early Paris. The speaker agreed with all that Mr. Ware had said of the importance of good seed, and would go even further. He gave an account of the crops raised by a gentleman in Salem on an acre of land. He has plenty of manure and water, and raises more than enough asparagus, peas, corn, and other vegetables, for a family of six or seven persons; pastures three cows, and raises eight tons of mangel-wurzels on an eighth of the acre, to partly feed them in winter. Mr. Moore thought that, by soiling instead of pasturing, he might keep another

cow. The land is low and flat, and free from stones; well underdrained, and does not suffer from drought. It was probably a swamp in former times. The owner has a tannery near by, and applies to the land the tan ashes from under his boilers, as well as animal manure.

Mr. Moore thought the amount of fertilizing matter received from the rain and air was not understood. All plants grow better for frequent stirring and thorough pulverization of the soil. It is well settled that plants take all their nutriment through their roots, and not through their leaves. Four-fifths of this nutriment is nitrogen, which they take in the form of nitric acid or of ammonia. This is the most costly of all fertilizers, and the speaker asked whether constant stirring did not cause the nitrogen of the air to combine with the elements of the soil, so that we could manure to some extent from the air. Certainly, the good effect of stirring the soil is not wholly due to mechanical action.

The discussion was listened to by a much larger audience than at any previous meeting, and all appeared to be deeply interested in it. The President announced that the subject for the next Saturday would be "Flowering Plants, New or Old, most Desirable for General Cultivation," to be opened by William H. Spooner, Chairman of the Committee on Plants and Flowers, and Dr. Henry P. Walcott.

BUSINESS MEETING.

SATURDAY, February 25, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the Chair. No business being brought before the meeting, it

Adjourned to Saturday, March 4.

MEETING FOR DISCUSSION.

This was opened by the reading of the following paper by the author: —

Flowering Plants, New and Old, Most Desirable for General Cultivation.

By William H. Spooner, Jamaica Plain.

It is said that the first duty of a good soldier is obedience; so when our captain, last Saturday, ordered me to the advance today, I felt obliged to make the attempt, though with little time for a proper arrangement of the subject, which renders it impossible to notice more than a portion of the plants of recent introduction.

Among the variety of new deciduous perennial and annual plants which are brought yearly to public attention many are of little value, except as novelties, and the general cultivator should select with care. First, there is the *Iris Kœmpferi* and varieties, most of them grown from seed; during the past four years we have had opportunities of noticing many of these beautiful seedlings, in rich and diversified colors. The additional advantage of being perfectly hardy, places them high in the list of deserving plants.

In Lilies, our distinguished associates, Parkman and Hovey, have given us the two grand varieties, *Lilium Parkmanni* and *L. Hoveyii*, both of which will undoubtedly prove hardy, adding, as they do, the strong character of the *lancifolium* to the *auratum*, and we trust with a more reliable constitution than the latter. From Mr. Hovey we have also the fine lily Melpomene, so strongly individualized in its prominent markings. What would these worthy gentlemen have said had they been told, during their careful labors in hybridizing, that their successful work would perhaps become food for the imagination of the modern æsthete? *Lilium punctatum* is a variety deserving more general cultivation, perfectly hardy, and producing a large bulb; the flower is of a delicate white color, spotted with salmon. There are also *L. Leichtlini*, *L. Batemanni*, *L. Neilgherriense*, and other beautiful and novel kinds, but of doubtful hardiness.

Mention should be made of *L. Takesima*, the rival of *L. longiflorum* and a more profuse bloomer and stronger grower, and I presume equally hardy, if properly treated. Perhaps many of the new sorts which our President and others have so successfully shown in the Halls during the past four years will prove worthy additions to the best collections.

Eulalia Japonica is a most elegant ornamental grass, throwing up annual shoots about three feet high, with beautiful striped variegation extending almost the entire length of the stem. It is crowned in the autumn with delicate tufts of bloom, and, if cut before fully opened, these will gradually develop, the branches of the panicles curving back, and making it, in its feathery appearance, one of the best winter decorative grasses.

Eulalia Japonica zebrina is another variety, similar in growth to the last mentioned, but marked across the stem in divisions of light and dark green. Both these are perfectly hardy, and for this reason more desirable than the Pampas Grass.

Gnaphalium Leontopodium, the "Edelweiss" of the Alps, with pure white star-shaped flowers of a downy texture, is ardently sought for by tourists, and is, perhaps, the more charming from the almost inaccessible spots of which it is a native, though I am not aware that it has proved difficult of cultivation elsewhere. It has been grown successfully at the Arnold Arboretum.

The so-called *Polygonum Japonicum* is a hardy, rapid-growing climber, with variegated foliage, and resembles the Madeira Vine (Boussingaultia) both in leaves and flowers. The specimen I have seen is that of President Hayes.

Azalea mollis, in its many varieties, with their abundant blossoms of delicate hue, and their hardy constitution, has added a very valuable feature to the early bloomers.

Hovey's Seedling Japanese Hollyhocks have seemed to me a very great acquisition. The varieties which John C. Hovey has shown during the past season indicate a distinct break from his seedlings of two years ago, and a very marked advance, approaching the double form. In color they are marked with the national characteristics, which add a pleasing variety to these showy summer flowering plants.

The Seedling Delphiniums, from Dr. Walcott, are the best of

this class of flowers, perhaps, that have ever been shown, with immense spikes of well-developed blossoms, and of distinct colors.

Moore's Seedling Phloxes indicate progressive development in these useful plants.

Hyde's White Gladiolus is a grand variety of this popular plant, and, as I have had occasion to say before, a variety possessing great vigor, which will be recognized as a valuable addition to our summer flowering bulbs.

Gladiolus purpureo-auratus, the new hardy (or nearly hardy) variety, when hybridized with the Gandavensis varieties is likely to lead up to a very desirable class. Lemoine, the celebrated French cultivator, is producing some very choice kinds.

The popular taste seems to be returning to the original types in the flower kingdom, as elsewhere, and single varieties of many of the leading plants, among which the Dahlia may be particularly mentioned, are eagerly sought for. Paragon, a very dark-colored single dahlia, is especially attractive.

It is with the greatest satisfaction that we can turn to so many fine seedling plants, of tender habit, of home production.

Our venerable associate, the "old man eloquent," has added another arrow to his well filled quiver in his Seedling Azaleas, and the variety Marshall Pinckney Wilder is the forerunner of a race that is destined to become popular.

Among Carnations Tailby's seedlings have proved a free-flowering strain. Grace Wilder is a variety of remarkably delicate color, and is a free bloomer.

Bouvardia Alfred Neuner is a sport from *B. Davidsoni*, with double white flowers, and as free in its bloom as its parent.

Hovey's Seedling Camellias are plants of remarkable character,— vigorous growers, and profuse flowerers.

Among border plants, *Cineraria acanthifolia* is a noticeable sort for summer bedding purposes, with striking foliage, and one of the most useful of its class.

Alternanthera paronychoides major aurea is of a dwarf but robust character, with bright golden foliage.

Alternanthera latifolia aurea also has brilliant foliage, and a broader leaf. Both these will undoubtedly prove valuable acquisitions.

Salvia farinacea is of branching habit similar to *S. splendens;* its color is light blue, and it is quite free in bloom, but not to be compared with *S. patens*. *Salvia Pitcheri* is of a new color, a most intense blue; flowers small in comparison with other varieties, — more like a lobelia, — blooming very persistently. Mr. Sheppard calls it "a summer bloomer, and worthy of special notice, as one of the very best flowering plants that we have added to our list for a long time."

Chrysanthemum frutescens, or Marguerite (Paris Daisy), is quite desirable for flowering purposes. This flower is offered in immense quantities in the French flower markets; color, white, with yellow disc. Another variety is a yellow flower, called Etoile d'Or, or Golden Star.

In Annuals we notice some remarkably fine additions, such as *Papaver umbrosum*, a single-flowered Poppy; in color brilliant crimson, with a shining black spot on each petal; a profuse bloomer, growing about a foot and a half in height.

In Petunias, the single and double fringed varieties have made remarkable strides in rich striped, mottled, and self colors.

Nasturtiums and Tropæolums of new shades have added a rich and gorgeous hue to the summer garden.

The new variety of Mignonette, Miles's Hybrid Spiral, produces a very large spike of flowers; it is an abundant bloomer and of delicate fragrance. We had, last Saturday, an opportunity of seeing, from Mr. Gardner, two of the finest specimens ever exhibited here.

The varieties of *Phlox Drummondi grandiflora* are strong growers, and free bloomers, in rich colors.

There are several additions to the Sweet Peas, of which we may mention Butterfly, with white ground, delicately laced with lavender-blue, very sweet-scented; and Violet Queen, of dwarf habit, and a deep violet-blue color.

Perhaps one of the most popular annuals of recent introduction is the *Calendula officinalis* Meteor; flowers very large and double; color, light golden-yellow, distinctly striped with deep orange; a wonderfully profuse bloomer in the summer garden, and equally so under glass. One cultivator tells me it is very nearly hardy with him.

Helianthus nanus foliis variegatis is a particularly desirable new Sunflower, of dwarf pyramidal habit, branching almost to the ground; the leaves are nearly all spotted and striped with yellow variegation; the flowers are double, not very large, and bloom from the base upward. The lovers of this now fashionable flower will find this variety one of great merit.

Antirrhinum nanum picturatum appears to be a new and distinct race of Snapdragon, of dwarf habit, comprising several kinds, having diversely shaded and striped flowers.

In conclusion, the Hybrid Tea or pedigree Roses should not be omitted, but can only be mentioned.

Discussion.

William C. Strong was called on for information in regard to the Triomphe d'Angers rose, and said that in the house it is, by all odds, the freest flowering rose — even more so than Bon Silene, and the most fragrant of all the Hybrid Perpetuals. It sports a great deal in color, and affords many different shades, sometimes becoming purple. In its best condition it is well formed — not expanded. It flowers freely out-doors, but is not quite as vigorous as some. Mr. Strong said that last year he expressed the opinion that no amount of manure could injure roses; but he thought that he had injured his roses this year by giving them too much manure when in a dormant state; and also last spring, by putting fresh horse manure on the surface of the beds in large quantities. The Triomphe d'Angers was one of those which suffered. Bennett's Hybrids have disappointed him in some respects. For florists' use they are surpassed by the Perle des Jardins. He did not think it was the horse manure which made them inferior to others. The Beauty of Stapleton is vigorous; but he did not think they would generally take the place of others.

Henry Ross, in reply to an inquiry concerning a new Alternanthera originated by him, said that he considered it a remarkable variety. The foliage has a very strong yellow — much stronger than that of another new variety which has been advertised with high recommendations, and which is really a valuable bedding plant. It shows the yellow very early. He is, however, not as

much interested in bedding plants as formerly, but more inclined to shrubbery and herbaceous plants, which every one can have whether he has a greenhouse or not. Bedding plants are much more trouble. He would not discard bedding plants entirely, but would substitute hardy plants for a portion of them.

O. B. Hadwen had given some attention to flowers, particularly hardy flowering shrubs and herbaceous perennials. For common cultivators who have not time to give to annuals they afford great satisfaction. *Exochorda grandiflora* is one of the best shrubs; the flowers are most charming, and keep a long time in bloom, and it is perfectly hardy. *Azalea mollis* also is perfectly hardy, and the numerous varieties, in every shade of color, afford an opportunity for study which will repay every one. It thrives best, and the individual flowers and trusses are largest, in a peaty soil. It is especially necessary that peat should be added to the soil when it is naturally clayey. The White Fringe tree (*Chionanthus*) is another beautiful shrub. It looks best when pruned in tree form. The new *Actinidia polygama*, from Japan, is a most vigorous climber, soon spreading thirty feet, with beautiful foliage and wood. The *Schizophragma hydrangeoides*, another Japanese vine, has very beautiful foliage, which it puts forth very early in spring, and retains until December. Of trees, the Purple Beech, Purple Birch, and the various kinds of Magnolias, are most desirable. The great variety of Pæonies, both tree and herbaceous, make a fine show from year to year. The perennial Poppies seem to gather strength and beauty year after year.

Mr. Strong asked why the *Kalmia latifolia* is not more cultivated. The *Azalea mollis*, which has been so highly recommended, it is true, is very beautiful, but only as long as it is in bloom, while the Kalmia is beautiful in its foliage the year round. The leaf is as handsome as that of the camellia; that of the rhododendron will not compare with it; indeed, no other plant will. The variety of color is limited, but the shrub is well adapted for suburban cultivation. It should have a sheltered and somewhat shady place, and a prepared soil.

J. W. Manning also could recommend the Kalmia for a great variety of soils and situations. He grew up among it, and has seen plants with stems four inches in diameter, and tall enough to

make four lengths of cord-wood. Small specimens can be transplanted safely. Many years ago he planted thirteen in the grounds of the Rev. Nathaniel Frothingham, at Burlington, and twenty years afterwards eleven of them were living, and from six to ten feet high. They were dug from pastures in New Hampshire. He has them in his own grounds, which he brought from Middleton; but most of those planted are imported from Europe. In transplanting from the woods stocky young seedlings should be chosen in preference to older and taller plants. The *Azalea viscosa* and *Clethra alnifolia*, two native shrubs, are very desirable, and easily transplanted. Both are very fragrant, and the latter is especially desirable for its late blooming. The *Akebia quinata* is desirable as a climber; it holds its leaves until zero weather, as does also Hall's honeysuckle. The *Ligustrum myrtifolium*, or California Privet, has large, glossy leaves, and endures bleak seashore exposures.

Hon. Marshall P. Wilder said that he had lived from the time when we scarcely knew what hybridization meant. It is the great agency for improving flowers as well as other plants. By this means we have obtained almost all the improved varieties mentioned by the essayist in his concise paper. The new hydrangeas, deutzias, viburnums, weigelas, spiræas, and pæonies, introduced from China and Japan within the last fifty years, are very beautiful and afford a basis for further improvement. He could remember when no such thing as a hybrid perpetual rose existed. The first to raise them were Laffay and Verdier, who drew their inspiration from Herbert and Lindley. Since then hosts and myriads have been raised and sunk in forgetfulness. Even now we cannot select twenty-five roses that unite all excellences; some have beauty of form and brilliant color, but no fragrance, and are little better than a piece of scarlet paper to afford refreshment, though they make a fine show in the garden, like dahlias, and for decorative purposes. We should strive to produce fragrant roses until we have a sufficient list possessing this as well as all other valuable characteristics. He has the Triomphe d'Angers rose spoken of by Mr. Strong, and would hold on to all of such exquisite character. There are certain things which have been so thoroughly tested that we know they will not

disappoint, and which may be easily obtained, such as the Purple Beech, the *Magnolia Soulangeana* and other species, the Cut Leaved Weeping Birch, the Laurel Leaved Willow, the *Viburnum plicatum*, the *Actinidia polygama*, a beautiful vine from Japan, which would soon fill this room, and which, though recommended for its fruit, is not of great promise except for ornament; and the Tree Pæonies, of which the Gloria Belgica and the Elizabetha are among the finest. *Azalea mollis*, a new species from Japan, is one of the most showy. The speaker has crossed it with *A. Indica*, and has seedlings growing.

President Hayes spoke of the beauty and vigor of the *Actinidia polygama*, which produced fruit in his grounds last year.

Charles M. Hovey said that Kalmias planted in 1844, in his grounds, are today twelve feet high and eight feet broad, with stems three or four inches thick, and in the season of bloom are covered with flowers. The Rhododendron and Kalmia are sociable plants, and will not grow alone, but must be planted in groups, and this is one reason why they are so much neglected. Naturally they are found growing on the edges of woods, which afford the protection that they need. If planted in exposed places, and a cold wind comes when they are loaded with snow, they are whipped round, so that the chances are ten to one that they will not be worth looking at in a few years. They look well in groups of from three to twelve, with azaleas intermixed. They like a peaty soil, as do all "American plants," but will do well in a sandy loam, though not in clay.

Mr. Strong asked if the shelter of surrounding houses would not answer.

Mr. Hovey thought it might. The Kalmia and Rhododendrons are like persons; of a group of twenty men standing out in a cold wind, the six in the middle will be comparatively protected from it, while those on the outside will suffer. The Rhododendron is very sensitive; on a cold day like this the leaves curl up. They require to have their brothers around them so that they can protect each other.

The Pæony has been vastly improved by French, Belgian, and American cultivators, but yet is not appreciated. Many of the varieties have a pleasant perfume. Planted in groups, or in the

background of borders, they produce a fine effect, with the colors varying from white tipped with carmine to black crimson. The speaker has a quarter of an acre of these plants which have not been moved for twenty-five years, and in the blooming season present a gorgeous appearance, many of the flowers being thirty-six inches in circumference. The flowers of the Tree Pæony are of immense size and great beauty; but the plants must have careful cultivation and protection from severe winters. For those who cannot give these, the herbaceous varieties are better.

Mr. Hovey said he would like to speak of such good old plants as the Acacias, Cytisus, and Heaths, which are now neglected for pinks and roses, as if we could have nothing else. The Clematis is one of the most valuable flowering plants. No plant of modern introduction has been so much improved, beginning with Jackmanni. The spring flowering varieties, which bloom before July, and then cease, have been neglected. These flower from the old wood. If Jackmanni and other summer flowering kinds are cut down they will flower through the season, but the spring flowering kinds will not.

Among native plants, the *Asclepias tuberosa*, or Butterfly-weed, and four or five of the Cypripediums are desirable and easily cultivated. They do best in a loose, sandy loam, mixed with leaf-mould or peat. They grow naturally on the edges of woods, where such a soil has been made by the decay of leaves. Some of the native Asters are delightfully beautiful; when we see them under cultivation we ask what they are. *Rhexia Virginica*, a native plant, is more beautiful than *Phlox Drummondi*.

Edward L. Beard said there was one race of plants which had hardly been touched by speakers who had preceded him, — the Pyrethrums. They are among the most interesting plants, and are very hardy, needing only a covering of leaves. The single and double varieties are very popular abroad. There are a hundred varieties, affording an astonishing amount of color. The double varieties are handsomest. Good clumps, well cared for, will multiply rapidly. Our gardens are apt, at times, to have a superfluity of flowers, and at others to be bare, especially the small gardens of amateurs in early spring, when they ought to be alive with flowers. It is not so in England, and though it is true that our springs are shorter and hotter, many opportunities are neglected.

The varieties of Narcissus are multiplying rapidly, and a surprising number are offered by Barr & Sugden and Thomas S. Ware; but only a very limited number are grown here. They are easily cultivated, and afford a remarkable range of variety, and nothing is more beautiful or satisfying in early spring. The Bicolor section is very numerous, and gives a great display of color. The *Chionodoxa Luciliæ*, or Glory of the Snow, a new bulbous rooted plant from Asia Minor, allied to the Hyacinth, has lived out-doors two years in Mr. Beard's grounds, and produces beautiful blue flowers in early spring. It promises to be one of the most valuable flowers of its season.

There are other bulbous rooted plants almost innumerable. The hardy section of the genus Gladiolus is very beautiful in early spring. It has lately been taken up with much enthusiasm by some of the European nurserymen, who have raised hardy hybrids, of which M. Lemoine has sent out six new varieties. We can gain more beauty in spring with Anemones, Ranunculuses, and Alpine plants in rockeries, though rockeries, as ordinarily constructed, are apt to look too much like piles of cobble-stones. A very different appearance was presented by a rockery which Mr. Beard saw in Dr. Henry P. Walcott's garden with Cypripediums and other hardy dwarf plants growing on it. Pansies afford great delight in early spring, and it is one of the simplest things to have them at that time, though most people fail to do it. We should study up the habits of plants more carefully than we do. The speaker thought the ceaseless glare of bedding plants in summer a most tiresome exhibition of color; they are cultivated as some dresses are worn: only because they are in fashion. They are in their glory in August, and soon after that time the frost takes them; but we get no wider range in them than in herbaceous plants, which are beautiful throughout the summer. The summer lilies afford a long list of beauties. Only a few are successful in growing the California lilies. The Double Geum has proved not to be hardy with Mr. Beard; but it is among the most beautiful of half-hardy plants. Nothing is more beautiful than the white *Anemone Japonica*. He lifted his plants, and put them in pots in autumn before frost, and placed them in the greenhouse, and they bloomed until Christmas. *Primula vulgaris*, though our summers are not so favorable for it as those of England, can be

cultivated here if we go about it right; and there are a great number of varieties of the Primula which are capable of successful culture. In England all the operations of gardening are performed with care. Here we dig a hole and plant lilies in clay, but in England they go down three or four feet in depth, and also drain. Our greenhouses often look like hospitals, being bare at seasons when, with intelligent forethought and preparation of flowering plants for blooming in succession, they could be made bright and beautiful from Chrysanthemum season until the summer comes again.

President Hayes said that in his summer home he had great pleasure in seeing the garden of a neighbor, who, though devoted to the duties of an arduous profession, had shown that he could carry on a garden without neglecting his professional duties. He introduced Dr. Holmes, of Lexington.

Dr. Holmes said that some of his neighbors think he has roses on the brain, and he admitted that he does like hardy summer roses. He agreed with Mr. Wilder in his remarks on fragrance; a flower has little charm for him without fragrance. He had cultivated a green rose, which proved to have not much more beauty than a houseleek, and was interesting only as a novelty. His ground is sandy, but he has peat to mix with it, and finds no difficulty in growing roses, either bush or climbing. Though the exigencies of his profession force him to neglect his garden sometimes for weeks together, it affords much pleasure to him and to many visitors.

E. H. Hitchings wished to enter his protest against the idea that flowers without fragrance have no value. He would lose one-half the pleasure of his rambles around the country in search of wild flowers, if this were so.

The President announced that the discussion of the subject would be resumed on the next Saturday.

BUSINESS MEETING.

SATURDAY, March 4, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair.

Hon. Marshall P. Wilder announced the decease of Thomas Potts James, of Cambridge, a Corresponding Member of the Society, and for many years Professor of Botany to the Pennsylvania Horticultural Society, and moved the appointment of a committee to prepare memorial resolutions. The motion was unanimously passed, and the Chair appointed Mr. Wilder, Charles M. Hovey, and Benjamin G. Smith, as that Committee.

C. M. Atkinson referred to the Special Prizes of Silver Cups offered by subscription at the last three Rose Shows, and the great interest which they added to the shows, — an interest which was not confined to Massachusetts, pilgrims from different parts of the country having been attracted to the exhibition. These prizes did much to introduce more fully to the public the improved varieties of the rose. He felt it a duty to the gentlemen who had contributed to the fund, to speak of the freedom and liberality with which they gave. He deemed it important that the prizes should be continued, and that the Rose Show should be made the grand feature of the year. He suggested that this year the subscriptions be in smaller amounts, and that the members generally be asked to contribute, and that a committee be appointed to take charge of the subject.

The motion was unanimously carried, and the Chair appointed as the Committee: Mr. Atkinson, William Gray, Jr., John B. Moore, William H. Spooner, and John C. Hovey.

Adjourned to Saturday, March 11.

MEETING FOR DISCUSSION.

This was opened by the reading of the following paper by the author: —

Flowering Plants, New or Old, Most Desirable for General Cultivation.

By John G. Barker, Lynn.

Hardy Climbing Plants. — Scott, in his "Suburban Homes," says that no one needs to be reminded of the beauty of vines and creepers. Many of the most vigorous and beautiful vines in the world are indigenous to our woods in all the States. I well remember, when on a visit to Oak Hill Cemetery, Georgetown, D.C., that one of the most interesting features of the place was that old trees, which in most places are cut down as soon as they lose their natural beauty, were not removed, but all the limbs were sawed off about three feet from the trunk, to a height of twenty or more feet, and at the base of the trees were planted the varieties of the English Ivy (*Hedera Helix*), which seemed to flourish to a remarkable degree in that climate, so as in a very few years to make the trees objects of beauty, and in this way to fill places which, if the trees were cut down entirely, would take years to make good with any small tree.

Where I once lived was an old apple tree, fast decaying, but occupying a position which would be barren indeed if it were removed. At its base was planted a good strong vine of the well-known *Wistaria Sinensis*. In a few years the old tree was thoroughly covered with the vine, and now every spring it is an object of indescribable beauty, with the thousands of long, pendulous racemes of flowers. I could with great ease show you several large piazzas covered with this same vine, which, when in flower, are every year the admiration of hundreds of people. The ease with which it can be grown and trained, so as to be easily removed if necessary to paint or repair, renders it one of the most valuable of all the flowering vines for cultivation.

The Trumpet Creeper (*Bignonia radicans*) should be more generally cultivated on walls and trees, being of vigorous growth

and adhering with great tenacity wherever planted. The foliage is not very brilliant, but the beautiful orange colored flowers, in the shape of a trumpet, borne in clusters in August and September, more than make up for the deficiency of the color in the foliage.

Clematises are also valuable, and reference has already been made to them at these meetings. They require artificial support unless planted where they can ramble among woodbines (Ampelopsis), and then, when in flower, are very beautiful, especially the Jackmanni variety, the purple flowers of which present a very striking appearance when intermingled with the foliage of the woodbine.

Climbing Roses are also exceedingly desirable, and should be more generally cultivated. Near my residence is a single plant of the Baltimore Belle, which covers a space of over two hundred square feet, and although said to be not quite hardy it has withstood the changes and severity of at least ten winters, and is each year completely covered with its beautiful, blush colored flowers, besides affording in summer a delightful shade from the sun, and at the same time not excluding the air.

The Honeysuckles, so well adapted for porches and verandas, should receive greater attention. The Red and Yellow Trumpet Honeysuckles (*Lonicera sempervirens* and *L. flava*) are two beautiful native sorts. There is also the *L. pubescens*, very luxuriant and distinct, with orange colored flowers. The Chinese or Japan Monthly Honeysuckles are deservedly popular; among them is the *L. aurea reticulata*, the leaves of which are beautifully veined with gold lines, — a vigorous plant for a veranda among the green-leaved varieties; or, when grown with *Clematis Jackmanni*, the golden foliage of the honeysuckle and the purple flowers of the clematis form a most beautiful combination of color.

Evergreen Flowering Shrubs. — The Andromedas are among the most desirable, the habit of growth being compact and neat; with their beautiful foliage and showy flowers, it has gained for them a front place in all collections of peat-soil plants. Mr. B. G. Smith, of Cambridge, can testify to the value and permanent beauty of *Andromeda floribunda*. I imagine an entire bed would be a sight not soon forgotten.

I would also call your attention to the *Daphne Cneorum*, which is quite hardy, and forms a dense bush, growing not over eight or ten inches high. It is a gem among shrubs, and deserves a good place on the margins of borders of taller shrubs, and will well repay for the tenderest care that can be given to it. The flowers are rosy-pink, and delicately scented.

The Rhododendrons and Azaleas have already been noticed, and I will pass them without remarks.

Deciduous Flowering Shrubs. — In May we may look for the bright *Forsythia viridissima*, introduced from Japan by Mr. Fortune. The leaves are of a deep green; flowers bright clear yellow; early and desirable. *Prunus triloba* (Double Flowering Plum) is one of the best additions to our hardy shrubs. It is also from Japan. *Spiræa prunifolia flore pleno* is one of the earliest varieties to flower. Many of the Lilacs also flower this month, as well as some of the Pæonies.

In June, the beautiful *Halesia tetraptera*, or Silver Bell, with its pretty, white, bell-shaped flowers, is very attractive and desirable. The *Deutzia gracilis* is so well known that no one would think of being without it. It is highly desirable for forcing. Viburnums also are in their glory this month. The Weigelas, so well known and valuable, follow the Lilacs in flowering. The old *Weigela rosea* will always be a standard variety. *W. hortensis nivea* is good. *W. amabilis*, which blooms quite late, should be in all collections. *W. Lavallei* is a fine variety; flowers dark reddish-purple. *W. nana foliis variegatis* is of a dwarf, spreading habit, foliage variegated and well defined; it stands the sun well, and is among the very best dwarf variegated shrubs. *Cornus sanguinea* is very ornamental, especially in winter, when the bark is blood red. The White Fringe, the Josika Lilac, and *Deutzia crenata flore pleno*, are among the choicest ornaments of the month.

In July, the *Spiræa callosa* and *S. callosa alba* flower, and, indeed, continue nearly all summer, and on that account are valuable.

In August, we have the Althæas and the magnificent *Hydrangea paniculata grandiflora*, the finest of all the shrubs that Japan has given us. Last year there was a difference of opinion among the speakers at these meetings as to whether the variety *grandiflora* differs from the type. In my judgment it does.

In the report of the Garden Committee mention is made of Buist's Variegated Althæa, which is very striking and effective; it holds the variegation excellently, and must prove a valuable acquisition to our variegated shrubs. *Bignonia grandiflora præcox* is a magnificent plant, producing a great abundance of large, coppery-crimson flowers, which last from July until frost. The only plants I have seen are in the grounds of our President, at Lexington.

The *Magnolia Soulangeana* is a most desirable shrub. Ex-President Wilder has a fine specimen ten feet high and eight feet in diameter, which, when in flower, is so beautiful that great numbers of people drive round to see it.

Hardy Herbaceous Flowering Plants. — Special attention has already been given to this class of plants in the discussions of this season; but I will venture a few remarks, and first of all to urge that more attention be given to Delphiniums, which should have a place equal with the Phloxes. There are very few plants that make a finer display in the flower garden and shrubbery, from early summer until late fall. Their cultivation is simple; any good garden soil will suit them, but if well enriched of course it is all the better.

I hope some one who has had experience with the Pentstemons will give us his experience. I have not; but it seems to me that if they are thoroughly hardy we have not yet given them the place they deserve. Messrs. Woolson & Co., of Passaic, N.J., in their catalogue, say the florists' hybrid Pentstemons are not hardy, but they give a list of nine varieties which they consider fine and perfectly hardy, near New York.

For centres of beds the *Eulalia Japonica* is excellent, the foliage being firm and graceful. The flower-stems, which do not appear until late in the season, add much to the beauty of the plant. It is one of the handsomest of all ornamental grasses, and for winter grass bouquets is invaluable.

The Iris is a very desirable and highly ornamental genus. From "The Garden," of July 6, 1878, we make the following extract: "Like a good many other plants, their season of bloom is not long enough to please all; but, by cultivating them in various places where they are not in the way when out of flower, this is not felt to

be a drawback. Among large shrubs, which ought to be more widely apart than they are generally placed; in thin copses, among dwarf shrubs; in tufts near water, and in isolated groups on the grass, near but not in masses of shrubs, are some of the positions in which they may be enjoyed, in addition to mixed borders and beds. In such places they would mark the season agreeably, and not be in the way when the bloom was over, which they are sometimes found to be when in borders. It is worth the while of all who care for hardy flowers to devote a little attention to establishing a good stock of these plants in their gardens. They have all the beauty of the finest tropical flowers, without their cost."

The *Iris Pseudacorus* is worth cultivating for its foliage, which, in a moist soil, such as it likes, will grow five feet high.

Of Lilies, unless it is to urge more attention to the cultivation of our native species, which are quite as desirable in our gardens as any of the other sorts, perhaps it would be well to say nothing further; but I sincerely hope that some member who has made a specialty of the cultivation of Lilies will give us a paper on the subject.

Pæonies have already been referred to in a previous discussion.

Solidago rigida is one of the best of the many Golden Rods.

Epimedium macranthum is a rare and beautiful little plant. No one who has once seen it will be without it.

Yucca angustifolia and *Y. filamentosa* are desirable. The last-mentioned variety is very beautiful in clumps on a lawn. At William Gray, Jr.'s, the large clumps on the lawn, with the ledges of rocks for a background, are very effective, and when in bloom the appearance from a distance is very striking.

Discussion.

Warren H. Manning added to the shrubs already mentioned as desirable, the *Andromeda polifolia*, with glaucous purple foliage in winter, and white flowers early in spring; *Euonymus nanus*, a trailing plant with narrow leaves, reddish-purple, and very handsome in winter; and *Cratægus pyracantha*, with clusters of white flowers in spring, succeeded by brilliant orange colored berries, which hold on well into winter; the foliage is evergreen. The

Weigelas in his father's grounds were almost all killed by the severe frost early in October. *W. alba* is very pretty, but a little tender; the leaves are not as smooth as those of the *W. rosea*. *Spiræa callosa alba* is dwarf, and not very hardy. Of herbaceous plants, *Pentstemon Cobœa* has clusters of rich purple flowers, and is perfectly hardy. *P. barbatus*, var. *Torreyi*, has long flowers of bright scarlet color; but the habit of the plant is not good. *P. grandiflorum* has dull purple flowers; it has proved hardy so far. *Iris cristata* and *I. pumila* flower in May, the German irises in June, and *I. Kœmpferi* in July, making a season of three months. *Solidago rigida* seeds very profusely, and fills the ground with seedlings. Of ornamental grasses, the *Erianthus Ravennæ* is very pretty, and valuable for winter bouquets; it grows eight or ten feet high.

William C. Strong spoke of the advantage to our gardens of the introduction of new shrubs of permanent beauty, like the Kalmia and the *Andromeda floribunda*. The *Cornus Sibirica variegata* is as desirable for the color of the wood in winter as *C. sanguinea*, and, as regards foliage, is the most desirable of all variegated shrubs. It differs from Buist's Variegated Althæa, but resembles the variegated *Cornus mascula*, though more beautiful. The color is somewhat similar, but in autumn it is suffused with rose. The yellow is bright and clear, with no look of sickliness.

Edward L. Beard said that he had lately been reading the new edition of Robinson's "Wild Garden," and was interested in his recommendation to revive the use of hardy herbaceous plants, which have become somewhat obsolete. The *Solidago rigida* is, perhaps, not strictly a garden plant, but it is beautiful to domesticate in wild, bare spots, and there its excessive seeding is not objectionable. In many ways Mr. Robinson is doing much for gardening. The book referred to gives many ideas worth considering, among which is the effect produced by large-leaved plants, generally considered rather coarse, like the Sunflowers, the Evening Primrose (which has become almost obsolete), the Rhubarb, and the Phytolacca. The hybrids of *Pentstemon grandiflorum* are not hardy here, though the word hardy is deceptive, and not applicable to the same plant in every season. The species mentioned cannot be relied on without lifting in autumn, and placing in a

cold frame, when it will make beautiful plants the next summer. *Senecio pulcher* is not very well known, but is one of the most striking of the Compositæ. It very seldom seeds, but if lifted in the fall, and placed in a cold frame, it makes underground roots, and can then be divided. *Tritoma Macoweni* is not so rank a grower as *T. Uvaria grandiflora*, but is of a most remarkable orange color, and sometimes hardy, and is one of the most desirable herbaceous plants. *Stokesia cyanea* can always be relied on. The speaker had stumbled on a clump of *Viola pedata bicolor*, the type of which is well known as growing on hills, in light, sandy soils. The variety *bicolor* is perfectly hardy and one of the most beautiful, though not as showy as the pansy. This and several other varieties of violet might be planted on rockeries. The different species of Corydalis are also among the most desirable for this purpose. The Fritillarias are one of the most beautiful races. *F. Kamschatkenis* is new and hardy, and worthy of attention. The number of new varieties of Snowdrops is surprising; and, as well as the common kind, they are very beautiful in the garden in early spring. Several hardy tulips have been introduced, among them *Tulipa Kolpakowskiana* and *T. Greigi*, brought by Dr. Regel from Northern Asia. They are tall-growing plants, perfectly hardy, and enjoy being let alone. *Iris Kœmpferi* sports from seed, and affords the chance of getting new varieties. *Clematis coccinea* is very remarkable; the scarlet flowers are not very large, but they cover the plant. It is one of the herbaceous species, dying down in autumn, and making a rapid growth in spring, and is perfectly hardy. Many new Pitcher plants — varieties of *Sarracenia Drummondi* — have been sent out with high praise; but it appears as though the growers only thought it necessary to tack on another adjective to charge a guinea extra. Poppies have fallen somewhat into disrepute; but clumps of the best varieties will form beautiful beds of color, harmonious with all around them.

Mr. Beard said that he wanted to grow all the hardy varieties of pinks. If confined to one flower he would take up this, and give the tender ones the protection of a cold frame. The colors and growth are beautiful and varied; and, with attention, this class of flowers could be made very interesting. He has imported many new varieties, and though his ground is clayey and not adapted to

their growth, he covers with leaf-mould and straw, and they come out good in spring. The Delphiniums are a wonderful race of plants. They have been greatly improved by M. Lemoine. One hundred and fifty seedlings, which Mr. Beard raised from seed received from him, were all worthy of the place of honor. Dr. Walcott also has raised fine new varieties from seed, showing that great advances have been made. The hyacinth-flowered varieties are especially beautiful. If the plants are cut down in the early part of summer they will give late bloom.

President Hayes said that the subject is so interesting that we wish to learn all we can of it, and he would like to hear from the ladies.

Mrs. R. L. Fay spoke of the *Arabis hirsuta*, used in rockwork, as very beautiful. There is a variegated variety.

C. M. Hovey said that the new Delphiniums are truly beautiful. The variety *Breckii*, raised by the late President of the Society, whose name it bears, may be excelled in stateliness by some of the newer kinds, but not in color or doubleness. Three years ago he visited M. Lemoine, who, after they had looked over his plants, gave him a package of seed which produced scarcely a poor kind, and some were superior to the named varieties. Mr. Hovey spoke of the industry of French men and women as the reason why they have succeeded in producing so many new and beautiful flowers; and, as an instance, said that after dinner at M. Lemoine's, a man brought in a pot of minute seedling tuberous rooted begonias, which Madame Lemoine began potting off before they left the table. Many of the old hardy herbaceous plants are probably lost, but some of them may be found in country gardens. We ought, while seeking to introduce new things, not to neglect the old.

President Hayes presented, and read, from the account of Mr. Hovey's cucumbers, raised in a pit in 1830 and 1831, referred to at the meeting on the 11th of February. The record was kept with the greatest care and minuteness, giving the length of every cucumber raised. The longest in 1830 was eleven inches, but in 1831 the length advanced to twelve inches.

The President announced that the discussion of the subject would be continued on the next Saturday.

BUSINESS MEETING.

SATURDAY, March 11, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair.

The Reports of the Treasurer and Finance Committee for the year 1881 were read by the Secretary, accepted, and ordered to be placed on file.

E. H. Hitchings called attention to the fact that the value ($20,746.12) placed on the Library, in the Treasurer's Report, is less than its real value, as it takes no account of the many donations of books by Professor Russell and others, or of the "Davenport Herbarium of Ferns," which appertains to the Library. This herbarium contains about eight hundred double sheets, with nearly three thousand specimens, representing thirty-one genera, and one hundred and fifty-six species, including every known fern of North America. It is one of the best fern herbariums in the country, and in some respects the very best, and is known by botanists all over this country and in Europe. In regard to its money value, Mr. Hitchings thought four hundred dollars a very low estimate. It was presented to the Society in 1875 by George E. Davenport, who has since added largely to it. The work done by Mr. Davenport on this herbarium, and his success in collecting specimens for it, are wonderful. Within the last two years Mr. Davenport has identified and named three new species, *Cheilanthes viscida*, *Notholœna Grayi*, dedicated to Professor Asa Gray, and *Cheilanthes Parishii*.

Adjourned to Saturday, March 18.

MEETING FOR DISCUSSION.

The subject assigned was a continuation of that of last week: "Flowering Plants, New or Old, Most Desirable for General Cultivation," and it was opened with the reading of the following paper by the author: —

A List of the Trees and Plants Growing in the Garden of Hon. William Brigham, in Boston, in 1841.

By William T. Brigham, Boston.

This Boston garden of forty years since was situated on the east side of Washington street, between Olive place and Blake's court, nearly opposite what is now Union Park street, but then an open field somewhat below the level of the street. The long, old-fashioned house stood endwise to the street, and formed a wall on the north side of the lot, which had a frontage of about a hundred feet, and an area of something like nine thousand square feet. It was quite out of town when first laid out, and for many years the Roxbury hourlies were the only public conveyances to and from the older city.

The contents of the garden in 1841, as appears from a list in my possession, comprised both useful and ornamental trees and plants.

Ranunculus acris, the flat Double Buttercup, with dark green centre, seldom seen now.

Aquilegia glandulosa, the purple-blue variety.

Delphinium consolida.

Delphinium elatum, the Bee Larkspur.

Aconitum variegatum, Striped Monkshood.

Pæonia officinalis, the old Pæony, with a color only surpassed by the Pæony of the Nevada deserts, which unfolds its blossom between two leaves. The odor of this showy flower was its chief fault.

Liriodendron tulipifera, the Tulip Tree, grew finely, and became about eighteen inches in diameter, with a clean, straight stem.

Podophyllum peltatum, the May Apple, so common on Goat Island, at Niagara, but not cultivated with us as its delicious odor deserves.

Adlumia cirrhosa, the Mountain Fringe, a most graceful vine.

Hesperis matronalis, Rocket, in its many shades of white and rose.

Matthiola incana or *annua*, Gilliflower.

Cheiranthes Cheiri, Wallflower, the bright ornament of many a ruined castle wall in central and southern Europe.

Iberis umbellata, Candytuft, both white and pink.

Alyssum maritimum, Sweet Alyssum.

Reseda odorata, Mignonette.

Viola odorata.

Dionœa muscipula was grown in a box, which was removed to the cellar in the fall. It seeded itself, and lasted a number of years.

Dianthus barbatus, Sweet William.

Dianthus plumarius, Pink.

Lychnis Flos-cuculi, Ragged Robbin.

Lychnis Chalcedonica, London Pride.

Silene armeria, Pink Catchfly. The seed of this was continued thirty years at Grafton, Mass.

Malope trifida, Great Flowered Malope.

Althœa rosea, the many-colored single varieties of Hollyhock, worthy a place in any garden, and not surpassed by the double varieties.

Hibiscus Syriacus, Althæa, so attractive in the latter part of summer.

Hibiscus, sp.

Tilia Europœa, Linden.

Tropœolum majus, Nasturtium.

Impatiens balsamina.

Rhus cotinus, Smoke tree, so attractive with its peculiar red and green.

Vitis vinifera, Sweet Water Grape.

Vitis Labrusca, Isabella and Wild Grape. The Isabella was one of the largest vines I have ever seen in this neighborhood. An elephant died in the city, and his remains were buried beneath the young vine, which, favored by the generous nourishment, grew over a trellis of many hundred square feet, had a trunk more than a foot in diameter, and annually bore from five to ten bushels of the finest grapes of that variety I have ever found. The trellis was supported about two feet from the house, and the crop always ripened early, with fine color and great sweetness. Cuttings from this vine have been growing in my other gardens ever since, but seldom ripen their fruit. The wild grape was cultivated for its delicious odor.

Æsculus Hippocastanum, Two large Horse Chestnuts, cut down in 1869, were but part of a row which extended at intervals from Dover street to the Roxbury line. One only now remains, — on the estate of the late William Dall, near Dover street, — and that will soon be cut down.

Melilotus alba, Sweet Clover, a very fragrant and desirable garden plant, and much used in Europe for fodder.

Robinia Pseudacacia, Locust, even then troubled with the borer.

Robinia hispida, Rose Acacia.

Lathryrus odoratus, Sweet Pea, grew, but not vigorously, and does not seem to thrive in Boston.

Lathryrus latifolius, Everlasting Pea, certainly deserved its name, for the stool grew for thirty years, and in 1851 was transplanted to Grafton.

Prunus Persica, four kinds of Peach trees, small fruit, of fair quality.

Prunus lævis, Nectarine.

Prunus Armeniaca, Apricot; three trees grew against a trellis on the west side, constantly encroached upon by the vines, but bearing an abundance of excellent fruit.

Prunus domestica, Plums, of three kinds, large trees, abundant bearers.

Prunus Cerasus, Black Tartarian Cherry.

Spiræa sorbifolia.

Spiræa Ulmaria, Meadow Sweet.

Spiræa lobata.

Spiræa Filipendula, Dropwort.

Rosa centifolia, Cabbage, White, and Yellow Roses.

Pyrus communis, Pear — St. Michael, Skinless, Seckel, and another, — all standards.

Pyrus Malus, Sops of Wine apple, a large tree, but bearing rather small fruit.

Pyrus aucuparia, Mountain Ash.

Cydonia vulgaris, Quince, two trees, bearing well.

Calycanthus floridus.

Ribes aureum, Flowering Currant.

Philadelphus coronarius, Syringa.

Philadelphus grandiflorus, Large Flowered Syringa.

Fuchsia coccinea (?)

Passiflora cœrulea.

Astrantia major.

Symphoricarpus racemosus, Snowberry.

Symphoricarpus vulgaris, Coral-berry.

Lonicera caprifolium, Monthly Honeysuckle.

Lonicera flava, Yellow Honeysuckle.

Artemisia Abrotanum, Southernwood, that "old-fashioned" garden plant which reminds one so much of the sage on the plains.

Artemisia absinthium, Wormwood.

Cacalia sonchifolia, Tassel Flower.

Callistiphus Chinensis, China Aster, — not the choice varieties that our florists now give us, which rival, if they do not surpass, the fine products of the Chinese pot gardeners.

Achillea Millefolium, Yarrow, pink and white.

Chrysanthemum Parthenium, Feverfew.

Calendula officinalis, Marigold.

Coreopsis tinctoria.

Dahlia variabilis.

Zinnia elegans.

Tagetes erecta, African Marigold.

Lobelia cardinalis, Cardinal Flower, grew exceedingly well, and lasted many years.

Campanula persicœfolia.

Campanula Medium, Canterbury Bells.

Primula officinalis.

Tecoma radicans, Trumpet-creeper. This trumpet-flower grew all over one side of a long shed, and flowered abundantly; never injured by frosts.

Catalpa bignonioides.

Verbena, sp.

Melissa officinalis, Balm.

Mentha piperita, Peppermint.

Phlox subulata, Moss pink.

Polemonium reptans.

Ipomœa purpurea.

Convolvulus tricolor.

Petunia violacea.

Petunia nyctaginifolia.

Gentiana quinqueflora, Blue Gentian, did well. It certainly deserves more attention, as it grows easily; and, although not quite so fine in color as the Fringed Gentian, is much more easily cultivated.

Vinca minor, Periwinkle.

Syringa vulgaris, Lilac, white and purple.

Syringa Persica, Persian Lilac.

Rheum Rhaponticum, Rhubarb.

Daphne Mezereum; a portion of this shrub is still living at Grafton, Mass.

Ulmus Americana, American Elm. My father was the planter of the rows of elms on Washington street, over the Neck. He excited an interest in the matter, and the result is seen in the fine trees still standing near Franklin and Blackstone squares.

Corylus Americana, Hazel Nut.

Salix Babylonica, Weeping Willow, a specimen larger than the one just cut down on Chauncy street.

Abies balsamea, Fir Balsam.

Thuja orientalis, Arbor Vitæ.

Calopogon pulchellus, Grass Pink, grew well.

Narcissus poeticus, the beauty of the Alpine swamps and fields in May and June.

Amaryllis formosissima, Jacobæan Lily.

Galanthus nivalis, Snowdrop, planted about the same time as those on the Hunneman Estate in Roxbury, that have all these years been the first tokens of spring in this neighborhood.

Iris, sp.

Tigridia pavonia.

Gladiolus Natalensis or *psittacinus.*

Crocus vernus.

Convallaria majalis, Lily of the Valley.

Polygonatum giganteum, Solomon's Seal.

Lilium tigrinum, Tiger Lily.

Lilium candidum, White Lily.

Lilium Canadense, grew exceedingly well.

Fritillaria imperialis, Crown Imperial.

Tulipa Gesneriana, three varieties, including the ragged. The

bulbs were taken up and re-set every year, and during the flowering attracted many visitors.

Ornithogalum umbellatum, Star of Bethlehem, was used for edgings.

Hyacinthus orientalis.

Funkia subcordata, and *F. ovata*, Japan Lily. Plants of this genus are still living in my yard in Boston, and the roots have supplied many gardens. A clump of the blue is attractive even when not in bloom, and the odor of the white is very delicious.

Hemerocallis fulva, Red Day Lily.

Hemerocallis flava, Yellow Day Lily.

Yucca filamentosa grew very well, although the soil was by no means so dry as that in which it flourishes in immense quantities on the line of the Pacific Railroad.

Tradescantia Virginica, Spiderwort, by no means so large as that I saw a few years since wild, in Kansas.

In 1851 the destructive storm that swept the tides over the then narrow Neck, and overturned Minot's Ledge Lighthouse, washed into and over this little garden. Its waters were fatal. The tulip tree died first, and then others at intervals; but the soil was never fertile again. Immense quantities of earthworms were destroyed, and several wheelbarrow loads had to be removed to prevent stench. The water was eighteen inches deep on Washington street.

Discussion.

E. H. Hitchings wished to say a few words in favor of the native orchids for cultivation in gardens. Dr. H. P. Walcott has successfully cultivated in his garden, in Cambridge, the *Habenaria blephariglottis*, *H. ciliaris*, *Cypripedium spectabile*, *C. parviflorum*, and *Calypso borealis*. The speaker travelled two hundred miles in search of the Yellow Fringed Orchis (*Habenaria ciliaris*). Dr. Walcott also cultivates successfully the *Trillium grandiflorum* and *T. erythrocarpum*. The *Rhexia Virginica* has succeeded too well; it propagates so rapidly that it is in danger of becoming a weed. It is very showy. The speaker thought the *Urticularias* or Bladderworts might be cultivated by those who have the conven-

ience of a pond. He had seen a brook where part was purple with *Urticularia purpurea*, and thought this species might be grown in the centre of a pond, and *U. resupinata*, *U. cornuta*, and *U. gibba* around the margin.

Benjamin G. Smith, being called on, said that he had been confined to his house for twelve weeks, and during that time had realized, as never before, the beauty of the evergreen shrubs which he could see from his windows, such as rhododendrons, kalmias, and andromedas. He has an octagonal conservatory fifteen feet in diameter adjoining his library, which has afforded him even more than usual pleasure while unable to go out; for, by opening a door, he could fancy himself in Florida. This little conservatory accommodates three hundred pots of flowers, and there has been hardly a day during the winter when he could not cut a bouquet from it for his table. It is heated by a Wethered boiler, of the smallest size. Some have objected to a conservatory adjoining a dwelling-house, that the necessary fumigation pervades the house; but he has rubber strips on the door opening into his library, and has had no trouble from this source.

Charles M. Hovey said that in 1836 he published in the "Magazine of Horticulture," which he then edited, a list of flowers blooming from month to month through the season, comprising the very plants in Mr. Brigham's list, beginning with *Phlox subulata*, or Moss Pink, and *P. stolonifera*. The Podophyllum, or May-apple, grows well in the shade. Though the Delphiniums are much improved, none surpass the old Bee Larkspur (*D. elatum*) in stateliness. The Adlumia, or Mountain Fringe, will take care of itself. *Dianthus barbatus* (Sweet William) and *Lychnis Flos-cuculi* are as desirable as ever. The Spiræas are all pretty. *Astrantia major* is very beautiful. The present popularity of Marigolds (*Calendula officinalis*) shows how slight a change is necessary to bring an old flower into notice again. The whole list, Mr. Hovey said, carried him back to the good old times when gardens were filled with flowers, each of which possessed an individuality, instead of with masses, as in bedding. This should be adopted only as an episode in gardening, and should be separated from other portions of the grounds. Mr. Brigham's list also reminded him of his

mother's herb garden, where she raised herbs, not only for herself, but to give to her neighbors. It contained the old Cinnamon rose, well known for its fragrance, though he rarely thinks of fragrance in flowers; he loves them for their beauty, and if they have fragrance so much the better. This garden was, like Mr. Brigham's injured by salt water, but earlier, — in 1832 or 1833. On the 2d or 3d of March the tide was a foot over the main road, and, though it covered the garden only an hour, it killed many plants. The speaker thought this should lead all who apply salt to their ground to be very cautious in the use of it. Mr. Hovey alluded to the deceptions in regard to plants practised by foreign adventurers, who have published catalogues containing blue tuberoses and rhododendrons, and lilies and carnations a foot in diameter and striped with blue. Much ingenuity and talent, which might be better employed, are required to get up such a catalogue. He also condemned the formation of rockeries in immediate connection with highly architectural houses, and the prevalent taste for gypsy kettles, painted bright red and hung from a tripod, to plant flowers in.

Hon. Marshall P. Wilder said that at a previous meeting he did express the desire that a rose should have fragrance, but he would not exclude an otherwise fine variety, because it lacked that excellence.

President Hayes alluded to the beautiful exhibition of flowers, which surpassed all previous ones of the season, and especially to the fine specimens of Hybrid Perpetual roses from John B. Moore, and called on Mr. Moore to say something of them.

Mr. Moore admitted that he had the rose fever; it took him seven or eight years ago; and, unlike the annual rose colds, it is chronic. He likes an old rose or other flower if it is as good as the new ones, but not otherwise, and he would not praise a flower merely because it is old. Few of the roses originated before 1860 are worthy of a place in the garden now. He thinks more of a rose if it is fragrant than if it is not. It is a strong point in its favor; but he would not reject a fine variety — the Baroness Rothschild, for instance — because it is destitute of fragance, any more than Mr. Wilder would throw away his collection of camellias because they are not fragrant. The Alfred K. Williams and Duke of Teck

are two of the best new roses; they are of good color and form, and the latter promises to be a good grower, and the flowers are fragrant. He would not throw away such old stand-bys as the Marquise de Castellane, — perhaps the finest rose of its color. He thought that very unwise stories had been told of the difficulty of growing good roses. It is nonsense to say that a bed four feet deep, and half rotten sods and half manure is necessary. Eighteen inches is deep enough, and will give better roses. The essentials are plenty of manure, and plenty of water. Roses need water as much as strawberries, especially when it is desired to obtain continuous bloom from Hybrid Perpetuals, for to give this they must be kept in continuous growth.

The Chairman of the Committee on Discussions announced that on the next Saturday a lecture on the "Effect of Chemical Fertilizers on the Quality of Fruits and the Growth and Diseases of Plants," would be delivered by Dr. Goessmann, of the Massachusetts Agricultural College, who believes that he has discovered a cure for the yellows in the peach. The chairman stated that probably so good an opportunity to learn the results of the latest and most scientific investigations of the whole subject would not soon occur again, and it was desired that all present would invite such of their friends as were interested to attend.

BUSINESS MEETING.

SATURDAY, March 18, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair. No business being brought before the meeting it

Adjourned to Saturday, March 25.

MEETING FOR DISCUSSION.

The following paper was read by the author: —

On Mineral Constituents in Plant Growth.

By Charles A. Goessman, Ph. D., Professor of Chemistry in the Massachusetts Agricultural College, Amherst.

A careful examination of the circumstances which have favored the recent introduction of a more rational farm practice for the production of crops, cannot fail to prove that the recognition of the important influence which certain mineral constituents of plants exert on plant growth in general has contributed more to our success in agriculture than any other one which may be stated. The confidence in the correctness of the current opinion, that the presence of these mineral constituents in an available form in the soil is essential for the reproduction of any plant from its seed, is so firmly established in the minds of thinking agriculturists that we are apt to forget how recent the date when the first comprehensive experimental investigations in that direction rendered the existence of these relations between soil and plant more conspicuous. It seems at the present time almost incredible to notice in the writings of Justus von Liebig that, as late as 1830, one of the leading botanists of the University of Berlin, Sprengel, still asserted that ground bones are of no use as a fertilizer in Germany; or that the distinguished French chemist, Dumas, even ten years later, considered the mineral constituents of plants a mere incidental feature in the vegetable economy; or that before 1840 not one pound of Peruvian guano was used upon the farms of Europe, although Alexander von Humboldt, in 1814, had described its use as a fertilizer in Peru, and some shiploads of that material had found their way to the London market. In citing these instances I need not state that neither Liebig nor any other well informed student of the agricultural practice in previous ages denied the high appreciation of wood-ashes, bones, gypsum, lime, marl, and other mineral substances, besides the various kinds of animal manures, in the farm management of earlier times. Modern rational agriculture does not rest its claim of progress on the mere introduction of any particular new mode

of operation. For to try to maintain a remunerative fertility of the soil under cultivation by fallow and the rotation of crops, or to enrich one portion of the farm lands at the expense of another one by retaining a certain proportion of meadows and pastures to secure manure for the grain-bearing lands; or to enrich the surface soil at the expense of the subsoil by raising deep-rooting plants, as root crops, or leguminous crops, as clover, etc., for fodder and manure; or to improve the natural productiveness of the lands by deep ploughing, or by drainage, or by irrigation, are all modes of farm practice known, more or less, for hundreds of years. Our real progress in this direction consists mainly in the discovery of the *principles* which control the successful application of these practices in the management of farms.

Rational modern agriculture recognizes as the foundation of a successful farming the necessity of a strict restitution to the soil, in an available form, of those substances which the crops have abstracted, and it promises to that class of farmers who strive to comply with that requirement in the most economical way, the best chances of a *continued* financial success.

From a similar stand-point the earlier practice of using the above-named mineral substances and others in the farm management has to be judged as compared with their application at the present time.

As long as the composition of the air and the water was but little understood, and that of the soil practically unknown, no correct idea could be formed concerning their mutual relations, and still less regarding their connection with the life and the growth of plants.

For this reason, the first *successful* attempts to study the relations of the vegetable kingdom to these three agencies date only back to the close of the past century. They are largely the results of the labors of Lavoisier and Priestley. Foremost among the scientists who, at the beginning of the present century, devoted some attention to the chemical physiology of plants and the application of chemistry to agriculture, are De Saussure and Sir Humphry Davy. The former was the first who called attention to the variations of mineral constituents in plants, and pointed out some of their relations to the soil and the growth of plants,

whilst the latter recognized already the atmospheric source of nitrogen for plant growth. The works of these illustrious investigators remained comparatively unknown to agriculturists until Liebig, in his celebrated work, "Die Grund-sätze der Landwirthschaft," in 1840, called the general attention to their excellence and importance. Although more exact analyses of the ashes of plants had been accumulating, and some interesting features of the results had been pointed out, — as, for instance, the limited number and constant occurrence of the same mineral elements, as well as their varying proportions in the case of different plants, — no material change of opinion regarding their possible more intrinsic relations to plant life took place during the time which passed between the first publication of the investigations of De Saussure and Davy, and those of Liebig. The year 1840 is, on this account, usually cited as the beginning of a new era in the history of agriculture and its associated branches. It is justly claimed as one of the most valuable services which Liebig has rendered to scientific and practical agriculture, that he demonstrated by the aid of previous investigations, as well as his own, the true connection which exists between soil and plant, and the *intrinsic* value of the mineral constituents in the growth of plants.

Accepting, as we do, Liebig's teachings that a certain kind and a certain amount of mineral elements are indispensable for the complete development of a plant through all its various stages of life, and that, in case the ash constituents of the plant are not supplied in due time, the plant may come to blooming, yet cannot produce a perfect seed, it becomes quite obvious that the time-honored practice of using wood-ashes, or lime, or marl, etc., above referred to, for manurial purposes, presents quite a different aspect to us from any that it could possibly claim in previous ages; for, knowing now, in consequence of previous careful analysis of the ashes of its particular kind, what elements the perfect plant contains, the practical experience of the past receives a more intelligent interpretation of its results, and future success a better chance.

The direction which Liebig's genius has given to the study of plant growth, with reference to its application in practical agriculture, has been pursued since with an interest and success un-

paralleled in the history of any province of science. Practice and science have already for years worked hand in hand to study the influence of physical and chemical agencies on the production of vegetable growth, and to reconcile real and apparent differences of experimental results.

Much has been accomplished — too much, in fact, to find here a mere passing enumeration; yet much more remains to be learned to free our present system of manuring from that degree of uncertainty which a reasonable prospect of success still demands. The unsatisfactory condition of our current modes of fertilizing our lands is, in a great measure, due either to limited information or almost entire ignorance concerning the following points: —

1. What are the mutual physical and chemical reactions of the various kinds of soil on the *different* materials we apply for fertilizing purposes? In other words, what becomes of the fertilizer in the soil?

2. In what *particular* form do the different plants absorb the various kinds of mineral plant food?

3. What are the *specific* functions of the different mineral substances of the plant food in the life of plants? What effect do they produce when applied in *different* combination?

The history of all well conducted field experiments points upon every page to the necessity of a closer study of every one of the above specified points, before any material improvement in our present mode of fertilizing our lands can be expected. The recently introduced practice of supplying our markets with special fertilizers for particular crops, if carried on beyond a limited generalization, deserves attention on account of the purpose of dealers to meet the desire of the farmers, rather than on account of either good economy or of a superior information in regard to the *special* wants of the *particular* kind of crop raised *under all conditions*. This remark applies with particular force to their use in horticulture and fruit culture; for the composition of most garden crops, as well as of fruits, is far less known than that of the majority of our farm crops.

A few ash analyses of plants do not suffice to decide what *kind* and what *amount* of mineral plant food a crop *needs*, and still less in what combination they produce the best effect. They simply tell

what kinds and amount the plants under examination *contain*. It is a well established fact that the same variety of plants, when raised upon different kinds of soil, or upon the same soil of a varying degree of richness, may contain a widely differing absolute amount of the same mineral constituents. There is, apparently, in plant life, a possibility of an excessive consumption of food, as we know there is in the case of animal life. Science has not been able, thus far, to ascertain the existence of any *definite numerical relation between the exact amount of essential mineral elements of plant food* and *the amount of organic matter which may be produced by the aid of the former*. Whilst we are thus still ignorant in regard to some vital points in plant life, it is quite encouraging to notice the steady progress in studying the more intrinsic relations which evidently exist between the composition of the organic and inorganic portion of the plant. The very circumstance that the various mineral elements cannot substitute each other to any extent, if at all, without altering the relative proportion of the proximate organic constituents of the plant, or even endangering its very existence, suggests that dependency. The question, Can we alter the composition of plants, and if so, in what direction, and by what means? has become of late one of the most prominent subjects of agricultural investigation. The best scientific resources of our time are called on to ascertain the principles which underlie a successful practice, if for no other reason than the prospective large pecuniary interests involved. Agriculture has already realized considerable advantages from investigations in that direction, by learning how to cultivate certain plants, with either a view to increase their value for fodder, or to enhance their market price for some industrial application. Numerous experiment stations do at present attend to the wants of agriculture; and horticulture, the most successful branch of agriculture, begins to realize the advantages it may secure by adopting the same course. Experiment stations for the promotion of its special interest date from 1870, Germany claiming already three or four, to experiment solely with fruits.

My peculiar situation, as far as time and means were concerned, as well as a personal interest in the progressive work of the present, induced me some years ago to undertake, with the kind assist-

ance of Professor S. T. Maynard, of the State Agricultural College at Amherst, a series of experiments upon the College grounds for the purpose of testing the action of more or less compound chemical manures, and of simple chemicals, on the production and composition of some fruits. Some of my results obtained in that direction are already, in part at least, published; others, of a more recent date, are only known to those connected with the work. I propose to relate both here, as far as they may add some interest to the matter under discussion.

I.

Experiments with Grape Vines.

Action of a special chemical fertilizer on the composition of the organic and inorganic portion of the Concord Grape and the Native Blue Grape—Vitis Labrusca.

The Concord grape vines which served in the experiments were planted in 1869 upon former pasture land. No fertilizer had been applied in the new vineyard excepting wood-ashes but once, in 1871, previous to my investigation.

In 1873 several plats containing three rows of Concord vines, six in each row, were set apart in a suitable locality for the application of the special fertilizer. Directly adjoining were planted at a similar distance from the Concord vines, corresponding every way with the arrangement of the former, in each plat twelve wild-growing specimens of the *Vitis Labrusca* (wild blue grape), taking care at that time that a part of the wild grape vine remained in its original place to secure the identity of variety, etc.

The original plant was left to its natural resources, and the transplanted part treated, in common with the Concord vines, with the following fertilizers per acre: four hundred and fifty pounds of dissolved bone-black, containing twelve per cent. of soluble phosphoric acid, and one hundred and eighty pounds of nitrate of potash, containing forty-five per cent. of potassium oxide and thirteen per cent. of nitrogen; or, fifty-two pounds of soluble phosphoric acid, eighty-one pounds of potassium oxide, and twenty-three pounds of nitrogen. One-half of the fertilizer was applied in the fall, the other half early in the spring.

The examination of the grapes from fertilized and unfertilized localities began three years after the first treatment of the various plats, and only the fruits of a corresponding state of ripeness served for the tests. The berries, freed from the stems, furnished the ash constituents. The juice of the entire grape was tested for grape-sugar only.

The results of all ash analyses contained in these pages, including grape, strawberry, and peach, are reported here only with reference to five prominent constituents: Potassa, Lime, Magnesia, Iron, and Phosphoric acid. Other constituents of the ashes, as soda, silica, etc., although quantitatively determined, are for the present excluded from the discussion. The various subsequent analytical statements do, therefore, not represent the composition of the entire ash, but refer to the relative proportions in one-hundred weight parts of the specified constituents. This course has been adopted to render the changes which occur in that direction more prominent.

	Unfertilized Wild Purple Grape, from the original locality (1876). Ash constituents.	Unfertilized Concord Grape, from the College Vineyard (1876). Ash constituents.
Potassium oxide,	52.54 per cent.	67.70 per cent.
Calcium oxide,	22.93 "	13.39 "
Magnesium oxide,	5.77 "	3.67 "
Ferric oxide,	0.81 "	0.47 "
Phosphoric acid,	17.95 "	14.77 "
	100.00	100.00
	Sugar in juice (1877) 8.22 per cent.	Sugar in juice (1877) 13.89 per cent.

	Fertilized Wild Purple Grape from College Vineyard. Ash constituents (1876).	Fertilized Concord Grape from experimental plat. Ash constituents (1876).
Potassium oxide,	66.35 per cent.	69.68 per cent.
Calcium oxide,	15.08 "	9.84 "
Magnesium oxide,	4.15 "	3.91 "
Ferric oxide,	0.57 "	0.54 "
Phosphoric acid,	13.85 "	16.03 "
	100.00	100.00
	Sugar in juice (1877) 13.67 per cent.	Sugar in juice (1877) 15.43 per cent.

The fertilized vines appeared, on the whole, more vigorous, and the leaves, as a rule, retained their vitality longer in autumn than in the case of the unfertilized ones; they escaped repeatedly a serious attack of mildew when the remainder of the vineyard suffered with it more or less. The sugar seemed to be somewhat increased in the fertilized fruit of the Concord grape, and had increased one-third in quantity in the wild purple grape. The increase of sugar was accompanied by a marked increase in potassa, and, at the same time, a remarkably reduced percentage of lime in the inorganic portion of the grape. The influence of fertilization on the composition and the character of the fruit manifested itself in a higher degree in the case of the native wild grape than in the case of the improved variety. The results of these experiments afford an additional illustration to the opinion that special fertilization must be considered a factor of more than ordinary importance in fruit culture. Of course, sugar alone does not control the quality, yet the fact that its amount can be altered by fertilization shows the existence of still untried modes of treatment to promote the interests of horticulture; for what has been noticed to affect the quantity of sugar may, by some modification, prove efficient in regard to other constituents.

The entire vineyard has been for several years fertilized, with satisfactory results, with fifty pounds of soluble phosphoric acid, one hundred pounds of potassium oxide in form of muriate of potash, twenty-five pounds of nitrogen in form of Chili saltpetre, — sodium nitrate, — and twenty pounds of magnesium oxide in form of crude sulphate of magnesia, or kieserite.

II.

Experiments with Strawberries.

The varieties used for the experiment were the President Wilder and the Charles Downing. In the case of the Wilder strawberry the following fertilizer was used per acre: three hundred pounds of rectified Peruvian guano, two hundred and fifty pounds of dissolved bone-black, and two hundred pounds of muriate of potash. The following analyses convey a good idea of the difference in ash constituents between the common wild variety, without special

manures, and the cultivated variety. The Wilder was raised with the aid of the above-mentioned fertilizers.

	Wild Strawberry (Richardson). Ashes of fruit.	Fertilized Wilder Strawberry (College grounds). Ashes of fruit.
Potassium oxide,	38.38 per cent.	54.07 per cent.
Calcium oxide,	25.89 "	14.79 "
Magnesium oxide,	trace	8.92 "
Ferric oxide,	10.56 "	1.91 "
Phosphoric acid,	20.30 "	20.31 "

The common wild strawberry contains usually one part acid to two of sugar, whilst it changes in the cultivated varieties from one of acid to four and more of sugar.

The experiments with the Downing variety were carried out for the purpose of studying the effect of five different kinds of special chemical manures on the ash constituents of this variety of strawberry. Five plats, fourteen hundred and thirty square feet in size, received the following fertilizers: —

Plat one. — 15 pounds of superphosphate (12 per cent. soluble phosphoric acid) and 5 pounds of nitrate of potassa.

Plat two. — 5 pounds of nitrate of potash and 10 pounds of calcined kieserite (crude sulphate of magnesia).

Plat three. — 15 pounds of superphosphate of lime, 5 pounds of nitrate of potash, and 10 pounds of kieserite.

Plat four. — Received nothing.

Plat five. — 15 pounds of superphosphate of lime, 5 pounds soda saltpetre (Chili saltpetre), and 5 pounds of muriate of potash.

The fertilizers were partly applied in the fall, partly in the early portion of spring; the fruits were collected in the second year, after applying the first fertilizer.

Analysis of the ashes of the Downing strawberry raised upon the above-stated five plats.

	I.	II.	III.	IV.	V.
Potassium oxide,	62.13	56.72	61.81	58.47	62.29
Calcium oxide,	12.57	14.12	12.21	14.64	12.46
Magnesium oxide,	5.96	3.29	6.00	6.12	6.33
Ferric oxide,	2.32	5.77	3.64	3.37	2.50
Phosphoric acid,	17.02	20.10	16.34	17.40	16.42
	100.00	100.00	100.00	100.00	100.00

The changes in the organic portions of the fruit raised upon the various plats will be studied the coming season, if time permits. As the mineral constituents of the berries show similar changes in relative proportion to those noticed in the previous experiments with grape vines, it is to be assumed that similar changes in the organic matter, and thus in the quality of the fruit, will be found.

The lime has decreased, and the potassa has increased, in plats one, three, and five, as compared with that in plat four.

The unfertilized plants in plat two form apparently an exception; yet the result may find a satisfactory explanation by the well known peculiar action of the sulphate of magnesia in sending the potassa rapidly to the subsoil, and thus beyond the reach of the roots of those plants which feed on the surface soil. Accepting this explanation, we have to assume that the presence of the superphosphate of lime (see No. 3) counteracts that tendency of the kieserite.

III.

Experiments with Peach Trees.

The trees were planted by Professor S. T. Maynard, at different times, beginning with 1869. Those under special treatment for the disease called the "yellows" were planted in 1870. Of this planting, those on the top of the knoll, in light soil, have shown the greatest indication of the disease, whilst those within seventy-five yards, in lower and richer lands, appear today perfectly healthy. For five years after planting the trees received but little care, and little if any manuring except that applied to grow one or two crops of corn upon the land used. No special manures were applied until 1876; and since that time only one crop (squashes) has been taken from the land, except the fruit from the trees. The land has been kept light and mellow by means of a large cultivator, and by light ploughing once or twice.

Two rows of the trees received in 1876 a dressing with two different chemical fertilizers. The trees had been planted twelve feet apart in every direction. The fertilizers were applied in a radius of eight feet around the tree, taking care to keep off about one foot from their trunks.

Fertilizer No. 1 consisted of thirty pounds of rectified Peruvian guano, twenty-five pounds of dissolved bone-black, thirty pounds of sulphate of potassa (Stassfurt salt, containing from twenty-five to twenty-eight per cent. of potassium oxide), and twenty pounds of crude sulphate of magnesia, or kieserite.

Fertilizer No. 2 consisted of thirty pounds of rectified Peruvian guano, twenty-five pounds of dissolved bone-black, and twenty pounds of muriate of potash. The amount specified in both instances applies to one-tenth of one acre. The trees which received either one of these fertilizers have made a better growth, and produced more and better fruit since, than the trees adjoining. There is no apparent difference between the trees upon the two experimental plats.

In the case of pear trees in different plats, which were treated in the same way and at the same time with both fertilizers, Fertilizer No. 1 has produced the best results in growth and in fruit. Both, however, surpass the unfertilized trees.

In 1880 a new series of experiments was inaugurated with iron-sweepings and iron containing phosphates. The entire orchard has received since, annually, some potash containing phosphates, with good results. The special treatment of the diseased peach trees, pronounced by good authority to be suffering from the yellows, began in 1878, when my personal attention was first called to its appearance on the top of the knoll in the College orchard. Instead of undertaking to describe here the characteristics of that much dreaded disease of the peach tree, I prefer to leave that task to my friend, Professor D. P. Penhallow, a graduate of the Massachusetts Agricultural College in 1873, who has kindly assisted us during the past eight months by carrying on such microscopic observations, regarding the origin and the nature of the disease through some of its various stages, as seemed desirable to me for the formation of an intelligent opinion concerning the possible cause of the disease. The results of Professor Penhallow's work are of unusual interest, and I do not doubt will be deservedly appreciated by all those who take an interest in the subject here under discussion. The manuscript containing a detailed description of the characteristics of the disease, and his microscopic work, illustrated by drawings representing various stages

of the disease, will form a most valuable addition to the present discourse. The manuscript is at the service of the Society; and the Professor, who, at my solicitation, is present, will be pleased to explain his observations if desired to do so.

The general appearance of the diseased trees suggested to my mind, at first, that an abnormal condition of the soil might be the cause. This condition might be ascribed either to a more or less general exhaustion, or to an absence of only some one or other *essential* element of plant food; or, finally, to the presence of some injurious substances which might have accumulated in the soil from some cause or other in the course of time. I felt inclined to consider, in either of these cases, the fungus which covers and disfigures the diseased parts of the trees a secondary feature of the disease. My observations of later years, with grape vines and currants in particular, have tended to strengthen in my mind that view in regard to many of our troubles with parasitic growth and diseases of plants. I have repeatedly noticed that plants suffered seriously from mildew and blight upon unfertilized and exhausted lands, when upon adjoining fertilized plats no sign could be noticed. On the other hand, the healthy condition of the roots, even to the last stage of the disease, and also the gradual disappearance of the green color, indicating insufficient production of chlorophyll, which causes the gradual change from a healthy appearance to a sickly one, beginning with the outer termination of the branches, which is the most active part for the formation of new vegetable matter, seemed to point towards a localized trouble,— a possible interference with the normal cellular functions, — an alteration of the osmotic action of the cellular tissue, and thus subsequent death of its affected part. This view of the case found support in the well known observations of Messrs. Nobbe, Schrœder, and Erdmann (Chemnitz, 1871), regarding the action of sulphate of potassa and chloride of potassium on the growing of rye and of buckwheat. Sulphate of potassa had caused first a premature yellow color of the entire plant, which terminated with its gradual failing; whilst the chloride of potassium (muriate of potash) had caused a vigorous growth, a rich, dark green colored foliage, and a successful production of grains.

An examination of the cellular tissue of the diseased plants had

shown an excessive accumulation of starch in the cellular tissue, indicating thereby a retention of that constituent, and but little chlorophyll was noticed. On the strength of these results I began, in 1878, to treat slightly affected trees with a phosphatic fertilizer in the usual proportion, adding at the same time from three to four pounds of chloride of potassium (muriate of potash) for every tree, and the diseased branches were cut back once or twice to the healthy wood. Soon after, the new growth of the branches regained its green color. The details of this work were carried out by Professor Maynard, who today reports these trees in a vigorous condition. Not feeling satisfied with a mere assumption based on a presumed analogy of circumstances, during the last summer I invited Professor Penhallow to study the condition of the cellular tissue in branches collected on the 11th of November, 1881, from trees thoroughly diseased, and also from trees which were once diseased and are today in good healthy condition. For myself I reserved the analysis of the mineral constituents of a lot of branches from the same trees, collected the same day. In connection with these analyses I also made the analyses of the mineral constituents of the ripe and healthy (entire) early Crawford Peach, and that of the entire, prematurely ripened, diseased fruit. The following statement contains my results: —

	Fruit. Crawford's Early Peach. Healthy.	Fruit. Crawford's Early Peach. Diseased.
Ferric oxide, Fe^2O^3,	.58 per cent.	.46 per cent.
Calcium oxide, Ca O,	2.64 "	4.68 "
Magnesium oxide, Mg O,	6.29 "	5.49 "
Phosphoric acid, P^2O^5,	16.02 "	18.07 "
Potassium oxide, K^2O,	74.46 "	71.30 "
	100.00 "	100.00 "

	Branch. Crawford's Early Peach. Restored.	Branch. Crawford's Early Peach. Diseased.
Ferric oxide,	.52 per cent.	1.45 per cent.
Calcium oxide,	54.52 "	64.23 "
Magnesium oxide,	7.58 "	10.28 "
Phosphoric acid,	11.37 "	8.37 "
Potassium oxide,	26.01 "	15.67 "
	100.00 "	100.00 "

The above analytical results show a remarkable difference in the composition of the mineral constituents of the healthy and the diseased plant. The differences in both cases are most remarkable as far as potash and lime are concerned. The difference is more conspicuous in the branches than in the fruit. The diseased objects contain less potash and more lime than the healthy ones.

The subsequent statement contains a summary of Professor Penhallow's results: —

1. Healthy wood shows comparatively little stored starch; but fungous growth is present in the outer layers of the bark.
2. Diseased wood shows an abnormally small development of the cells, and the invariable presence of large quantities of starch; also an abundance of fungous growth.
3. Diseased leaves show the presence of fungous growth, discoloration, and cells filled with starch.
4. The fungus appears first on the surface of the trunk or branches, and thence enters the woody structure when the conditions are favorable.
5. There is little or no difference between the tissues and cell contents before and after the leaves fall.
6. While fungus is abundant on fully diseased trees, it is also to be found on trees which, *once diseased, had been restored to a condition of vigorous health.*

The previous statements seem to confirm some of the views entertained by me when planning the investigation. The results seem to point towards an interior disorder before the fungus enters the living tissue.

Whether some other internal or external influence, or both, inaugurates the disease, whether the various forms of the disease are merely a matter of degree, or whether they are of an entirely different character, must, of course, be left to future investigation. I consider my results of a general interest rather on account of what they suggest than of what they seem to me to prove.

Professor Penhallow then read his paper, as follows: —

Yellows in Peach Trees.

By D. P. Penhallow, Houghton Farm Experiment Station, Mountainville, Orange County, N.Y., late of the Imperial College of Agriculture, Japan.

Our study of the Yellows in Peach trees has early led us to recognize the fact that we have to deal, not with one disease alone, as nearly all writers upon this subject seem to consider, but with two distinct affections. A multiplicity of terms is always to be avoided; but in this case it seems eminently proper that, if we are to arrive at any very precise knowledge of this disease, we should in the beginning make a clear distinction between the Yellows proper and Blight.

Blight is characterized in the following manner: young trees which have made a vigorous late growth and apparently winter well, and even in some cases start into a vigorous growth in the spring, are suddenly attacked by a disease which causes the parts affected to turn nearly black. This is sometimes confined to a few of the main branches, when the tree may recover, or it may strike the main trunk, destroying the entire tree in a few days. The roots are always found to be in a healthy condition. We have to observe, further, that this disease generally attacks trees before they have borne any fruit, while the very close resemblance which it bears to the blight of pear trees, not only as to its external appearance, but with regard to the peculiarities of cell structure and contents, justifies us in the belief that it is really the same disease, and should, therefore, have the same name applied to it. The very limited amount of time which we have been able to give to an examination of this disorder will not justify us in any expression of opinion as to the probable cause and the measures which may properly be taken for its prevention and cure. Our only purpose in thus drawing attention to it is to make it clear in the beginning that we have two diseases to deal with, and that it is essential to carefully distinguish one from the other.

Without at present attempting to enter into a discussion of the various theories which have from time to time been put forth to account for the yellows, it is our only purpose now to give a concise statement of those facts which have been developed during our examinations of the past six months.

Looking first to the symptoms which characterize the yellows and enable us to clearly separate it from blight, we have the following: —

We first of all observe a sickly yellow color in the leaves, which, later, generally extends to the branches, and thus gives to the entire tree the yellow color on account of which the disease was very appropriately given the name it now bears. The fruit ripens prematurely (from two to four weeks before its season), often becomes abnormally velvety, possesses a high, unnatural color, which is usually likened to the hectic flush of a consumptive person, and has an insipid, unnatural flavor.

The new growth of wood is generally made on the main branches near the centre of the tree, or upon the trunk, in clusters of small wiry shoots. Though not an important symptom, the older branches often show large cracks in the bark, from which flow gummy exudations. The leaves, in addition to their unhealthy yellow color, are of abnormal size, often reduced to one inch in length, and in very many cases are curled, spotted with bright red and brown patches, and in later stages show many perforations where the tissues have decayed away. These, then, are the prominent symptoms by which we generally recognize the disease; but others of equal importance will appear as we examine more carefully into the character of the cell contents and the peculiarities of the cellular structure. Perhaps our purpose will be best accomplished by following the examinations somewhat in detail.

The leaves from a small growth of diseased branches upon a tree otherwise quite healthy were small and yellow, but not curled, or in any way spotted to such an extent as to be perceptible to the unaided eye. Their average length was only 4.15 centimetres, — much less than half the length of a healthy leaf. Under the microscope there appeared the mycelium of a fungus penetrating the intercellular spaces. Occasionally there would be found a minute perforation directly through the leaf, around the margin of which the fruit-bearing mycelium formed a delicate web. Leaves taken from a thoroughly diseased tree averaged 6.42 centimetres (about one-half the length of a fully healthy leaf), were of a yellow color, spotted with bright red or brown, and often perforated with numerous large holes (Fig. 1). This, however, generally rep-

resents the appearance of the leaves in an advanced stage of the disease. A surface examination showed slightly colored places, where fruiting branches of the mycelium were seen to project above the epidermis. Around the borders of the holes and on the red and brown spots were to be found the same fungous forms as in the previous case. A section plainly showed the mycelium penetrating the intercellular spaces and some of the cells themselves. All the cells were fairly well filled with starch. The red color, which forms so conspicuous a feature of diseased leaves, appears first in the veins and then in the veinlets, and after a time becomes manifest in the epidermis and subjacent cells of the mesophyll, generally appearing first in the immediate vicinity of stomata and near the extremity of a vascular bundle. That the discoloration is introduced through the vascular tissue appears evident from this as well as from the fact that numerous sections showed the color to be strictly confined to the veins in the first instance.

A young branch taken from a tree of fine, healthy development, before the leaves had fallen, had an average diameter of 0.51 centimetre, including the bark. It is important to note here that the tree from which these branches were taken was once diseased, but had been restored to a condition of vigorous and healthy growth by a course of special treatment extending over a period of three years. The general structure of the wood presented no abnormal features. The cells were quite regular and well formed, and in radial direction averaged 835 to the centimetre. The central pith-cells showed walls of uniform thickness, with occasional pits or thin places. Toward the wood the walls became of greater thickness, and the pits more numerous. Starch grains were present in those cells immediately bordering upon the wood, and in the medullary rays, but they could not be considered abundant. The bark likewise showed no remarkable structural features. Viewed from without by aid of a pocket lens, numerous small, sub-conical formations, often leading into large cracks, could be seen; but these formations, called lenticelles, are normal, and generally to be found on young branches about the time the epidermis is replaced by cork. While these structures are at first quite small, they eventually may lead to extended rupture of the bark. They appear, however, to serve as a convenient nidus for the growth and fruit-

ing of fungi, the mycelia of which can easily penetrate the loose tissue of their interior (Fig. 2). The cells of the bark, as a whole, presented nothing abnormal. Crystals of calcium oxalate were somewhat frequent, but the amount of starch present was quite small, the grains being minute and very much scattered. The healthy bark is shown in Fig. 5.

Small, wiry, diseased branches of last year's growth, from a tree which otherwise presented a very healthy appearance, had an average diameter of 0.266 centimetre. The wood-cells showed no striking abnormalities beyond the fact that they were very small, averaging 1075 to the centimetre in radial direction. The central pith-cells showed walls of pretty uniform thickness, but with numerous pits; where the pith adjoined the wood, the cells showed no increase in thickness of the wall or in the number of pits. All the cells adjoining the wood, as well as the cells of the medullary rays, were found to be densely filled with starch. The bark showed a marked looseness of structure and modification in the general form of the cell. There was an entire absence of crystals, but all the cells were completely filled with starch (Fig. 4); in the outer bark the lenticelles were observed to be numerous, and apparently much more frequent than on healthy branches of the same age. In them mycelia were abundant, as well as in the intercellular spaces beneath.

Branches of one year's growth from a thoroughly diseased tree, and having an average diameter of 0.50 centimetre, showed no remarkable structural features in the wood, except that the grain appeared somewhat more open than in fully healthy tissue. The walls of the pith-cells showed a slight increase in thickness and number of pits as the wood-cells were approached. The outermost pith-cells, as well as the cells of the medullary rays, were well filled with starch. The bark showed the same structural features as were observed in the last diseased branch, with this difference, that crystals of calcium oxalate were frequently noticed, and the whole structure appeared looser and much more irregular. The cells, however, were well filled with starch, and the same fungous growth was observed. It should be noted, however, that there will be frequently found less starch stored up in

the youngest branches than in those which have attained an age of two or more years.

Wood of several years' growth shows the same structural features. Where the disease has operated for some time the effect is usually seen in the more disintegrated condition of the tissues, among which the mycelia penetrate and often fill large cavities which have been formed by the entire destruction of the cells. This last feature is particularly seen in the vicinity of ruptures where there are gummy exudations. In the older structure, therefore, of trees affected with the yellows, the loose character of the tissues often comes to be a marked feature of the disease. Comparing the healthy and diseased tissues, both before and after the leaves have fallen, there appears nothing essentially different from what we have already observed, either in the structure or in the amount of stored starch. On the older branches it is not an uncommon thing to find the bark deeply ruptured for a considerable distance, and about this an accumulation of gum. These ruptures apparently originate by the cracking of the bark in the vicinity of lenticelles; and as there is not sufficient vitality in the parts to throw out a proper formation of cork, a continued exudation of gum naturally follows. Decay is then introduced into the superficial layers exposed, and as growth of the next season continues, the rupture becomes deeper, but does not heal, though there is a tendency of the new wood and bark to close over the injured part (Fig. 3). These ruptures seem to be favorite places for the growth of fungi, which were more abundant there than elsewhere. The gum, when moist, affords a fine nidus for the growth and fruiting of the mycelium, which not only penetrates the bark in all directions, but enters the woody tissue also.

To give a general summary of what we have already stated, we find:—

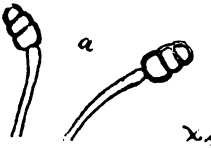
1. The progress of the disease is comparatively slow, and generally it does not appear until after the tree is somewhat exhausted by bearing one or more crops of fruit.

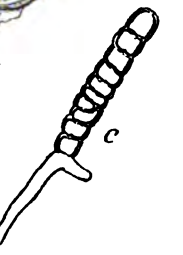
2. Healthy wood shows comparatively little stored starch, but fungous growth is present in the outer layers of the bark.

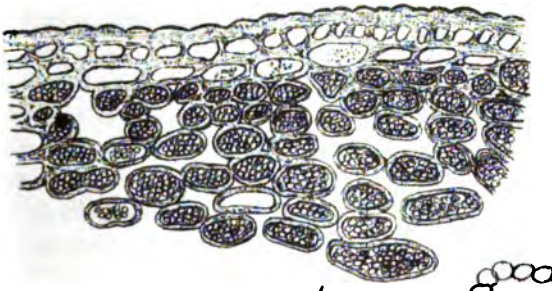
3. Diseased wood shows an abnormally small development of

x 20 2

x 5 3







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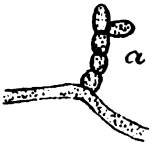

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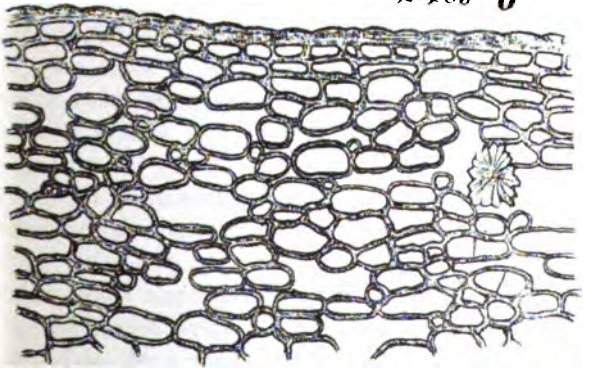

x 200. 5

the cells, and the invariable presence of large quantities of starch; also an abundance of fungous growth.

4. Diseased leaves show the presence of fungous growth, discoloration, and cells filled with starch.

5. The fungus appears first on the surface of the trunk or branches, and thence enters the woody structure when the conditions are favorable.

6. There is little or no difference between the tissues and cell contents before and after the leaves fall.

Fungus.

Our attention now turns to a consideration of the fungus previously noted.

On the leaves, wherever there are black spots, and on the stem, chiefly where there are gummy exudations and some decay, there will be found the mycelia and fruit of *Bispora monilioides* Cd., often in large numbers. This fungus is very common on decaying stumps, where it forms black, velvety patches. The spores are rounded or elliptical in form, and finally divide by a transverse septum. As they thus increase in number by repeated growth and division they may fall apart very early, or, as is very frequently the case, remain connected in the form of long, moniliform filaments (Fig. 6). Under suitable conditions of warmth and moisture the spores are multiplied in this manner with great rapidity, and the fungus may thus extend over a very large surface in a short time. Associated with this fungus, on leaf and stem, was an abundance of *Pleospora herbarum* Rabh. (*Sphœria herbarum* Pers.) Which is the more abundant it is difficult to say, but either one is present in sufficient quantity to account for the final destruction of the tissues in which they grow. *Pleospora* is quite abundant on herbaceous stems. It was chiefly recognized in this case by the macrogonidial form (*Macrosporium sarcinula*); but the conidial form was also to be observed occasionally, chiefly on the leaves (Fig. 7). The spores present many strong variations in form and size, and, though not so represented in the drawing, they have a well defined brown color. *Ascomyces deformans* may sometimes be found, it being the fungus peculiar to the curl of peach leaves.

Its presence is not an essential feature of the yellows. Trees affected with the latter may likewise suffer at the same time from curl or they may not, and so *Ascomyces* may or may not be present with the other fungi.

The conditions favorable to the rapid development of fungi in general are warmth and moisture. Dryness and a low temperature both operate to retard growth in a greater or less degree. Applying these principles to seasons in their effect upon fungoid growth we should find that during a warm season of great atmospheric humidity — such as was the last summer in many districts — the conditions would be most favorable. A dry season following, development would be retarded, and the more prominent features observed in leaves of trees affected with the yellows would doubtless show little if any increase.

Discussion.

Dr. Goessmann said that nitrogen may be applied to the soil, in the case of deep-rooting plants, in the form of nitric acid. Potash chloride in considerable quantities has apparently a specific action, and the speaker was of the opinion that the chlorine must have aided in preventing parasitic growth. For the yellows he would apply three or four pounds of muriate of potash to a tree six or eight years old, in a circle of eight feet radius, but would keep it a foot away from the trunk. It would be well to mulch the ground first, and apply the muriate on the mulch in order to distribute it more evenly. A solution containing one-thousandth part of the saline is most likely the limit of the quantity of fertilizer needed in the soil. We have not yet inquired as to the effect of an excess of fertilizers in the soil; a propagating house would be the most favorable place to experiment on this point. He would give complete fertilizers in preference to partial ones wherever the conditions of the soil were unknown. He prefers applying phosphate in the form of dissolved bone-black, and nitrogen in some definite form to control its temporary supply. It is between blooming and forming the fruit that nitrogen and phosphate are most needed by fruit trees; and it is well to supply an excess, that the plant may accommodate itself. He had noticed the yellows in the

early part of the season, first at the ends of the branches, when but slightly present. It might not show itself distinctly until the second season. If caused by exhaustion it will go on gradually; a series of sultry days, causing stagnation in the sap motion, favors fungous growth, and may thus inaugurate internal disorders.

Charles M. Hovey said that the blight attacks pear trees in July, but he had never seen a peach tree, when it came out healthy in spring, turn yellow the same year. Peach trees under glass never have the yellows. Col. Thomas H. Perkins cultivated the peach extensively in houses thirty or forty years ago, and the speaker never heard of the yellows there or in England. In France and England the peach trees all mildew; those around Paris are white with mildew. The absence of yellows in Europe suggests the inquiry whether it may not be climatic instead of being due to fungus. In 1800 Judge Peters, of Philadelphia, mourned over the decline of the peach, and applied every remedy he could think of, and this has been repeated at different eras since then. In 1857 the peach trees were destroyed by the severity of the winter.

J. Croucher (recently from London) said that the yellows is not known in England, which, in his judgment, went to prove that the disease is the result of wrong conditions of soil or atmosphere. The condition of the atmosphere is of the highest importance in regard to the health of trees. He had heard much talk of the potato disease and of the vine disease, but there is one principle that professors forget, which is that all conditions unfavorable to the highest forms of vegetable life favor the development of the lowest forms, and render superior conditions negative. Fungi live on decayed plants, and on animal rather than vegetable substances. Carbon tends to the growth of plants, and we must give them the quantity they need, and they must get it from the soil. The speaker has supplied it by placing charcoal in tanks with water, when the water absorbs the carbon, and if then used for watering will destroy the insects which live on the roots of plants, and the plants will become green and healthy. When you render a man positive by giving him the proper conditions of health, he does not care for disease, and the speaker felt sure that if the water prepared as described by him were given to peach trees at the proper

time, they would come up strong and resist disease, and the effect would be the same on the grape vine and potato. Mr. Croucher said he had the greatest respect for science, but, unfortunately, professors are not practical men. With the increased use of artificial manures we get increase of disease in plants, just as we get increase of disease in man with the increase of artificial living. The best manure is charcoal dissolved in tanks of water to give carbon, and cow-dung to give ammonia.

Josiah W. Talbot thought that the fungus mentioned by Dr. Goessmann does not cause disease, but is a consequence. The remedy proposed by him is to apply potash, and bring the trees into the same healthy condition as the last speaker would produce by means of carbon, and then the fungus will disappear. Mr. Talbot asked whether wood-ashes would have the same effect as the potash chloride.

Dr. Goessmann replied that if the chlorine has anything to do with curing the trees of the yellows, as he supposes it has, the ashes will not answer. The reputation of wood-ashes as a fertilizer rests on the same basis as that of barn-yard manure; it is a complete but not the most efficient manure for special wants. Carbonate of potash would furnish more potash than ashes of equal weight, but is too expensive; the muriate is much cheaper. The observations of which an account has been given, afford suggestions rather than proofs of the cause of the yellows, and the remedy for it. The disease may be due to atmospheric influences; on a sultry day, as stated before, when evaporation cannot be carried on, stagnation may result and cause disease. But the elements mentioned are essential to the growth of plants, and no one of them can supersede or replace the other. This is not a matter of opinion, but of thousands of analyses; a change in the relative proportion of the same ash constituents, he finds to be accompanied, in case of the same plants, by changes in relative proportions of the organic constituents.

Hon. Marshall P. Wilder said he felt diffident in speaking, after hearing the remarks of the gentleman from the Royal Horticultural Society of London (Mr. Croucher); but he felt greatly obliged to the gentlemen who had come here to give us the results of their investigations at the Agricultural College. He had practised hor-

ticulture all his life on the basis of science. What is science but induction from observations of the operations of Nature? True science is founded on practice, and will never be in conflict with it. It is from science that we learn the adaptation of soils and fertilizers and crops to each other, and that we detect the deficiency or superfluity of any element that causes disease. There is no reason to fear that the improvement of science will cause disease. Our food is better now than that of our fathers. The use of fruit alone is a vast improvement. We are deriving vast benefits, though we may not fully understand them, from the investigations of those who are giving their lives to the service of the Agricultural College.

William C. Strong said, in reference to the remark that the yellows is unknown in peaches under glass, that the borders for trees in houses are always carefully prepared. In the former part of his essay Dr. Goessmann dwelt on fertilizers as affecting the quality of fruits, and he would be glad to hear more on this subject.

Dr. Goessmann said he believed we may expect to control the quality of fruits to some extent at least. The result of his experiments with the wild grape was, that the quantity of sugar was raised from eight to thirteen per cent., and though sugar alone does not constitute quality, it is reasonable to suppose that we may affect other elements. The wild beet has been changed by cultivation to the sugar beet. Tobacco fertilized with sulphate and carbonate of potash differs from that fertilized with muriate of potash. These facts afford the basis for inquiry how further changes may be affected.

Mr. Hovey remarked that quality depends largely on the proportion of sugar to other constituents. In many places in France three qualities of the same variety of grape are produced on the same estate.

The meeting was more fully attended than any previous one, and the papers by Professors Goessmann and Penhallow were listened to with the deepest interest and attention. President Hayes said that he had listened with great pleasure to the essays from these learned and practical gentlemen, who had practically made the experiments of which they had given us the account, and he felt

most grateful to them. He presented the following vote, which was unanimously passed: —

Voted, That the thanks of the Massachusetts Horticultural Society be given to Professors Goessmann and Penhallow, of the Massachusetts Agricultural College, for their very interesting, suggestive, and instructive essays read this morning upon the mineral constituents in plant growth, and on microscopic investigations of the diseases of peach trees.

President Hayes announced that on the next Saturday C. M. Atkinson would read a paper on "Ornamental Gardening," and also that the subject of today would be further considered.

BUSINESS MEETING.

SATURDAY, March 25, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President John B. Moore in the chair.

Hon. Marshall P. Wilder, chairman, made the following report: —

The Committee to whom was referred the duty of preparing resolutions in memory of the late Thomas Potts James, a Corresponding Member of this Society, report the following: —

Resolved, That in the sudden removal by death of Thomas Potts James, a Corresponding Member, this Society has lost one of its most highly respected associates, and one who for many years has cheered us by his frequent presence at our meetings, by his coöperation in the promotion of horticultural science, and the study of the vegetable kingdom, especially the mosses and lichens of our continent from Central America to Alaska, the results of which he was preparing for publication at the time of his death.

Mr. James removed from Philadelphia to Cambridge some years

since, and was connected with many societies for the advancement of science in our land. He was Professor of Botany to the Pennsylvania Horticultural Society, one of the founders, and for twenty-seven years Treasurer, of the American Pomological Society, Fellow of the American Academy of Arts and Sciences, Fellow of the American Association for the Advancement of Science, Member and Officer of the American Philosophical Society, Member of the Boston Society of Natural History, and of other kindred associations. In all the relations of life he was conscientiously devoted to whatever was committed to his care. In a word, he was a true friend, an upright man, and a Christian gentleman.

Resolved, That these proceedings be entered on our records, and that a copy of the same be forwarded to the widow of the deceased.

MARSHALL P. WILDER,
BENJAMIN G. SMITH,
CHARLES M. HOVEY,
} *Committee.*

Charles M. Hovey said that, owing to Mr. James's retiring disposition, he was not known to all as well as he was to several of the members, but in his special province he was eminent. The speaker knew him a great many years ago, when he was an officer of the Pennsylvania Horticultural Society. On his visits to Philadelphia, to examine the many beautiful gardens there, Mr. James afforded him much aid by pointing out the best, such as those of Messrs. Rush, Pepper, Smith, and Pratt. He probably did as much as any other man to bring the Pennsylvania Horticultural Society up to the usefulness which it has attained, and was well known to all the members of the American Pomological Society.

Benjamin G. Smith spoke of his enjoyment of the company of Mr. James on a visit of the American Association for the Advancement of Science to the White Mountains. Several distinguished botanists were in the party, all of whom considered him most eminent in his particular branch.

The resolutions were unanimously adopted.

The meeting was then dissolved.

MEETING FOR DISCUSSION.

Owing to an important engagement, C. M. Atkinson, who had been announced to read a paper on "Ornamental Gardening," was unable to prepare it. The subject of the last meeting was therefore taken up, viz. : —

Mineral Constituents in Plant Growth.

Hon. Marshall P. Wilder said that at the last meeting a gentleman spoke of carbon derived from charcoal, decomposed or dissolved in water, as a great fertilizer, and advised its use. The speaker believed this view to be wholly erroneous, and wished to correct it, lest a wrong impression should go abroad, and those who look to these discussions for information should be led into error. Charcoal is not a fertilizer. It is not easily decomposed, but nearly indestructible, and wholly insoluble in water. It is a disinfectant and deodorizer, absorbing many times its bulk of ammoniacal gas. It acts as a storehouse of ammonia and moisture, giving them out as needed by plants. Its mechanical action is to lighten the soil, and it is therefore beneficial on heavy soils, like that of the speaker. It also tends to purify it and keep it sweet. If there is any principle established in the chemistry of vegetable growth, it is that plants take their carbon from the air by their leaves, and not from the earth.

Josiah W. Talbot said that Professor Penhallow's observations on the fungus which accompanies the yellows are interesting, but have little to do with the yellows. The fungus can be found on any tree nearly girdled by borers, but never on a healthy tree. To cure a diseased tree by removing the fungus, is to treat symptoms rather than the disease. Professor Goessmann's analysis of fruits may be useful to us all, and the discovery that the quantity of sugar in fruits can be increased by using certain fertilizers may lead to important results. Mr. Hill took a hundred Baldwin apple trees from the nursery, and planted them on land of different qualities, — highly-manured ground, pastures, and fields. The low, rich soil gives the largest fruit, but in quality it does not compare with that grown on high land with only ordinary cultivation. The

latter is yellow inside. A cart-load of salt which remained near a pear tree on the ground of the speaker, through a heavy rain, killed the leaves on one side, and when he picked up a little pear and tasted it he found it salt. This has a bearing on the absorption into the circulation of plants of salt and similar substances, and proves that fruit partakes of the nature of the fertilizer applied to it. The pears on the side of the tree away from the salt were not affected, but those on the side where the salt was deposited tasted as salt as weak brine. Dr. Goessmann stated that he spread muriate of potash around two or three peach trees in the college grounds, which were nearly destroyed by yellows, and they recovered. If this is true, it is one of the most interesting facts ever discovered, and is worth a fortune to the State of Massachusetts. The speaker was disposed to think it true, and the muriate a remedy, in part at least. Formerly there was no trouble in growing peaches here. If a tree was set out, it would grow and bear for years, and wheat was as easily raised; but now a peach tree bears but one crop, and if wheat is sown it fills out and is profitable for one year, but on the same ground the second year it yields only straw. This the speaker accounted for by the fact that in new land there is a great deal of potash, which is taken out by the crops and not returned. Dr. Goessmann supplied to the peach trees the potash which had been taken from the soil, and they recovered. So also with wheat; by using a fertilizer containing much potash good crops can be produced. Rye grass grown with guano will produce a good crop; the guano supplies phosphates and nitrogen, but not potash. Sometimes it is other ingredients that are lacking.

Leander Wetherell asked whether apples grown larger do not generally prove inferior in quality and keeping properties to moderate sized ones. If mangel-wurzels are grown very large, it is at the expense of their feeding quality, and the same is true of vegetable growth generally. A friend of the speaker, on Ware River, was recommended to use salt for rye on his land, and top-dressed with it at the rate of three bushels per acre, and grew rye year after year, as handsome as on new land, with clear white straw and heavy grain, well filled, and kept it up for eight or nine years. Before the salt was applied the land had borne only ordi-

nary crops. No other fertilizer was used. The soil was of fair quality, but not rich. The speaker was conversant with, and observant of, these facts. In his opinion land is not generally exhausted by wheat and rye or peaches so soon as Mr. Talbot thought. A peach tree on his father's place, standing on high ground among ledges, continued to bear fruit for a generation; but peaches on new land will not do so well now. Dr. Fisher, of Fitchburg, who is so successful in raising grapes, prefers mineral fertilizers to animal manures. The speaker read this morning of a case where only mineral fertilizers had been used, and the land increased in fertility. A former President of the Worcester County Horticultural Society raised a crop of wheat with the refuse of a comb factory as a fertilizer; but when reaped, though the straw was very fine, there was not a grain of wheat. The fertilizer supplied nitrogen, but no other ingredients. There is no better fertilizer, for generation after generation, than stable manure. Chemical fertilizers may be used with it, but the makers ask too much for them. The question of their economy is not yet settled. Professor Johnson, of New Haven, expressed a doubt whether they could be used profitably; and farmers should look to that point. The speaker had seen the result of the use of chemical fertilizers, in the shape of a crop of hay in the barn, which would not pay for the fertilizers used, and he convinced the owner of it. Mr. Wetherell advised farmers to be careful not to use too much nitrogen on their crops, so as to produce coarseness and quantity at the expense of quality, and to use all commercial fertilizers cautiously and wisely.

Mr. Wilder expressed astonishment at the account given by Mr. Wetherell of the effect of salt on rye. There must have been some other cause of such crops. Muriate of soda was advertised in New York as a very effective fertilizer, and P. T. Barnum bought thirty barrels, and when his man came to use it he found it only common salt.

Mr. Wetherell said he did not relate what he heard concerning the crops of rye, but what he saw. He stated the facts, not supposing that any one would understand salt to be a fertilizer, — its action is on other substances in the soil.

The Chairman alluded to Professor Goessmann's remark that

manufacturers of fertilizers desire to meet the wants of farmers in supplying the food for particular crops; but this arises from regard to their own interests, rather than because it is profitable to the farmers, or because they have information superior to that possessed by farmers in regard to the special wants of the particular crop grown under all conditions. Dealers have manures made up for every crop; but they do not know so much of the wants of those crops as any one in the audience present. Dr. Goessmann says that analysis shows a different constitution of the same crop from different localities. Sometimes the proportion of the same element in different crops of the same plant may be as five to twenty. In some cases a crop may have taken up deleterious matter, as in the instances mentioned by Mr. Talbot, where the roots of a pear tree took up salt. The farmer must adapt his fertilizers to his soil and crops; one may have decomposed feldspar in his soil, which, though insoluble, furnishes more or less potash. Chemists cannot prescribe as well for garden as for farm crops, because many more analyses have been made of the latter than of the former. The question of the influence of fertilizers on the quality of fruits is of great interest. Experiments on sugar beets with different fertilizers have tripled the quantity of sugar in them, and the same can be done with fruits. It is true that sugar alone does not constitute quality in fruits; there may be too much; but the trouble is apt to be the other way, and if we can increase the quantity of sugar in fruits, why cannot we change the quality in other respects? Mr. Moore thought he had improved the quality of his peaches by using a fertilizer composed largely of dissolved bones and muriate of potash. Dr. Goessmann thinks the sulphate of potash will not do for the yellows; they want the muriate, and this might be supplied by a mixture of salt and ashes. He says, also, that his experiments do not determine with certainty the questions on which he sought light; but he thought the conclusions arrived at are sufficiently probable to bring to the attention of cultivators.

Mr. Moore said he had used fine charcoal as an absorbent. It is not a manure, but it retains ammonia in large quantities, and gives it off as wanted. If you put a piece into the ground and come back two hundred years after, you will find it pretty much

the same. Market gardeners say fertilizers will not do for them, and the reason is that they grow hoed crops on the same land year after year without the alternation of grass crops to supply vegetable matter. They must have stable manure, and they want it fresh and undecomposed to supply organic matter; but the speaker was of the opinion that fertilizers can be used successfully in market gardening. He has seen several good crops of rye raised with two hundred pounds of Peruvian guano per acre. This gives nitrogen and phosphates, but no potash. Wheat can be grown here as well as ever; he had grown it at the rate of forty-five bushels per acre (which is more than is averaged on the rich lands of the West) on a half acre for three successive years. He furnished it with phosphates and all the other food it wanted. It was an early variety of winter wheat, ripening about the fourth of July. Many have failed here from planting late kinds, which are apt to blight. He gave up growing it because the quantity he needed was not sufficient to get it milled well.

Mr. Moore said that Mr. Hovey had asked for instances of yellows developing in summer on trees which appeared healthy in spring; but there are many such cases. It is an unaccountable disease. Forty-five years ago it was unknown here, and when it came it swept everything. A tree will set fruit well; the leaves on a certain branch — perhaps one that had appeared the most vigorous, and in the centre of the tree — will take a different tinge, and the fruit will ripen prematurely, while the rest of the tree will ripen its fruit at the proper season, and will not otherwise present any appearance of disease; but the next year the whole tree will go the same way. The speaker did not believe that it is caused by fungus in the ground. He knows certainly that sulphate of potash will give better potatoes than muriate, but cannot tell why. The sulphate is more costly than the muriate, but you get more actual potash in the same weight. Whoever would use fertilizers to the best advantage must use his own judgment as to the wants of his soil. No chemist can say, when a fertilizer is put into the soil, what form it will be in in three days. If you find anything that works wonders on your soil, that is the thing for you to use.

George F. H. Markoe said that chloride of potassium and muriate of potash are synonyms. The crude muriate of potash known

as Stassfurt salts contains sometimes as much as twenty-five per cent. of common salt, and the varying proportions may lead to different views among farmers as to its value. Manufacturing chemists may make fertilizers containing any given combinations, and they will retain their forms until mixed with the soil; then the character of the soil and water will affect them. Chemists will not attempt to make a universal manure, as quack doctors pretend to make universal medicines. Farmers should know enough to mix simple compounds themselves, and then it will not take each one long to find a mixture that will suit his soil. Any grade of chloride of potassium can be purchased, and if a large quantity is wanted it will pay to have an analysis made. Salt can be bought cheaper in the common form than in chloride of potassium.

Mr. Talbot thought that if chemists are honest they can buy the materials for fertilizers cheaper, and mix them cheaper, than farmers can. The manufacturers are trying to supply the fertilizers which the farmers want, and it is best, in using them, to begin on a small scale and use our own judgment, but still to depend on the manufacturers to make them. Professor Stockbridge has tried to get, in his fertilizers, what will come nearest the average wants of plants; but they may fail on some lands. The speaker had ploughed up old ground and put on Stockbridge's corn fertilizer, and got sixty-five bushels of corn per acre, which did not cost him over forty cents per bushel. The farmer mentioned by Mr. Wetherell, whose hay did not pay for the fertilizer used, probably put on three times as much as was necessary. The peach tree spoken of by Mr. Wetherell as growing among ledges probably got from their decomposition just what food it wanted.

Mr. Wetherell said that his friend used Stockbridge's prescription.

The Chairman said that the yellows is not caused by the exhaustion of potash, for it appears in new soils where there is no such deficiency.

Mr. Markoe said that there are many honest manufacturers of fertilizers, and his idea was that farmers should proceed as the chemist does in the laboratory; that is, should try on a small scale, and, when he has found out what his soil needs, should get the manufacturer to prepare it for him.

Charles M. Hovey was still doubtful whether a tree which was vigorous in spring ever took the yellows in summer. From his own experience he had come to the conclusion that it is climatic. He would be glad to see these experiments of Professor Goessmann succeed. His father had a peach tree, planted in 1813, which gave out in 1835 or 1836, as he thought owing to the cold weather. He thought also that the bursting of the vessels described by Professor Penhallow was due to the same cause. The yellows is not much known in the two lower counties of Delaware, where the climate is warmer and not so variable as ours; but they have it in New Jersey and Pennsylvania. Peach trees in houses, which are planted in a good border and manured from year to year, are never affected. The statements that have been made in regard to the inferior quality of fruit in low land are correct; the cells are larger than those of fruit from dryer soils and are filled with water. Fruit grown in Kentucky will not keep as well as that grown in New Hampshire or Vermont. On the same hill-slope in Germany three qualities of wine are produced, and the difference is wholly owing to the difference in the soil. The fungus which accompanies the yellows is the effect, and not the cause. It comes in after the tree is half dead, just as the stumps of elm and oak trees are covered with fungi.

Mr. Wilder confirmed what had been said of the difference in the quality of fruit caused by difference of soil. In 1867 he visited the famous Johannisberg Vineyard of Prince Metternich, and found that wine grown on the hill brought ten dollars per bottle; that from half-way down the hill five dollars; and that from the foot of the hill forty cents per bottle.

William H. Hunt said, in reference to Mr. Wetherell's account of the remarkable crops of rye produced with salt, that a field in his neighborhood has been cropped with rye for fifty years without salt, and has paid for the cultivation, producing fair though not great crops. The rye is sown in the fall, and not harvested until nearly a year after, and there grows along with it a considerable quantity of plants called "pussy-heads" (*Trifolium arvense*), which in their decay furnish much fertilizing matter.

Mr. Wetherell said that the field referred to by him was almost weedless.

Mr. Hunt said that the last year was a very poor one for potatoes; but a farmer in Concord had a field of eight or ten acres, which produced a very fine crop with no other manure than the Stockbridge fertilizer. It was found that the farmer mixed his fertilizer with plaster, and that the crop on several rows where plaster alone was used was just as good as where the fertilizer was applied. On old pasture land, that has not been ploughed for fifty years, the speaker could get a good crop with a little meadow-mud and ashes. He did not think that farmers could afford to buy fertilizers at present prices. For twelve or fifteen years he has not used a shovelful of manure on his grape vines. He had visited the Johannisberg Vineyard, and found that a stock of cows was kept to furnish manure for it. The vineyard is not manured every year.

In regard to the depreciation of scientific investigations, which some, calling themselves "practical men," have indulged in, Mr. Hunt said that those engaged in cultivation have little time for such researches, and that it is the business of scientific men to make them, and take whatever time is necessary to do it. In 1853 the silk-worms in France were attacked with a disease which went on increasing until the production of cocoons was reduced from 60,000,000 pounds to 10,000,000, entailing a loss of $20,000,000 annually. All the practical men could not stop it, and application was made to M. Pasteur, a chemist, who had never seen a silk-worm. He investigated the trouble, and found that it was caused by a parasite, but whether in the worm or the perfect insect could not be told, as it was too small to be detected even by the microscope. Nobody believed him; but in 1865 he took some worms and wrote predictions concerning them, which were found the next year to be fulfilled in all but two cases, and he suggested a remedy for the trouble. He also showed that sheep and other animals could be protected from certain fevers by inoculation, and Professor Tyndall said that his work on these subjects was worth more than the whole indemnity paid by the French to the Germans. The value to practical men of such researches is immense, and M. Pasteur does not stand alone in conferring such benefits on them. The speaker claimed to be himself a practical man, but from the conditions of the case he cannot do the work of the scientific investigators.

As this meeting was the last of the season Mr. Wetherell moved a vote of thanks to the Committee on Publication and Discussion, for the practical and efficient manner in which they had performed the duties devolved on them by the Society.

Benjamin G. Smith, Chairman of the Committee, said that, owing to his being confined to the house for many weeks by lameness, the work of the committee had devolved largely on his associate, John B. Moore, and to him the credit of the meetings was due.

Mr. Wilder expressed his thanks to all who had aided to sustain these discussions, for they redound to the credit of the Society, and great good will result from them. He referred to the commendation of the reports of the meetings in 1881 by Mr. Meehan, the editor of the "Gardener's Monthly," who, in noticing the TRANSACTIONS of the Society, spoke of them as only second to those of the Horticultural Society of London, which Thomas Andrew Knight and his contemporaries, by their contributions, made a work of reference valuable for all time. Mr. Meehan thought it was worth while to be a member of our Society, though one got nothing more for his annual subscription than the Transactions. The speaker agreed with Mr. Meehan, and said that he had been present as a hearer at almost every meeting, and had received as much benefit from them as from any meetings he had ever attended. He was especially pleased with Mr. Moore's remarks on fertilizers, and Mr. Hunt's on the advantages of scientific investigations to practical men, at the present meeting, and he was glad to see that so many ladies had attended the meetings. He felt deeply interested in the success of the meetings, and hoped they would be continued in years to come, for the Society stands on a higher plane on account of them. The speaker quoted Daniel Webster's remark, that the association of effort, by bringing people together, is the great motive power of improvement in the present age. No other means of advancing the objects of the Society in recent years has been so effective as these meetings.

The vote offered by Mr. Wetherell was unanimously passed, and the meeting then adjourned without day.

(*Continued from page 2 of cover.*)

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A HISTORY

OF

AMERICAN HORTICULTURE.

The attention of Trustees and Librarians of Public Libraries, and of Horticulturists generally, is called to the History of the Massachusetts Horticultural Society, for fifty years, from its foundation in 1829. This work will be found of general interest, as the introduction comprises a sketch, much fuller than exists elsewhere, of the History of Horticulture in the United States, from the settlement of the country to the foundation of the Society, and the history of the Society onward is, in the language of President Hovey, in his address at the dedication of the present Hall of the Society, "the History of Horticulture in our country." It is handsomely printed, on an extra quality of paper, and embellished with a fine steel engraving of Gen. H. A. S. Dearborn, the first President, and heliotypes of the two Halls erected by the Society. Among other interesting matters, it contains an account of the foundation by the Society, of Mount Auburn Cemetery, the parent of all similar cemeteries in the country.

The work is furnished to members of the Society at cost, $2.50, and to others than members for $3, but will be supplied to public libraries and booksellers at the same price as to members. Please address the Secretary of the Society, at Horticultural Hall, Boston.

ROBERT MANNING,

Secretary.

Press of Rockwell & Churchill, 39 Arch Street, Boston.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1882.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1883.

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The Committee on Publication and Discussion, take this opportunity to repeat what they have heretofore stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the papers and discussions now or before published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly. The award of a prize or gratuity for an Essay is not to be understood as implying that the Committee approve it in every particular, but only that they believe it calculated, *on the whole*, to promote the science or art of Horticulture.

BENJAMIN G. SMITH, *Chairman.*

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 1, 1882.

A duly notified stated meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

Benjamin G. Smith, Treasurer of the American Pomological Society, in behalf of the President of that Society, presented four copies of the Proceedings of the Society at the session in Boston, September, 1881.

Adjourned to Saturday, May 6.

BUSINESS MEETING.

SATURDAY, May 6, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

Hon. Marshall P. Wilder moved that a Committee be appointed to prepare resolutions in memory of the late Charles Darwin. Mr. Wilder said:

Mr. President: It is now known throughout the civilized world that modern science has lost one of its most distinguished promoters, in the death of Dr. Charles Darwin, the friend of our own Dr. Gray. I cannot, therefore, refrain from expressing the desire

that some notice of this event should appear on the records of our Society. As a progressive man in the study of the natural sciences, no one in the world has stood so high in the estimation of universities, academies, and scientific institutions. His various works on the origin of species, the variations of animals and plants under domestication, his arguments in favor of the doctrine of evolution, and his other works, present an immense number of facts which are in themselves an encyclopædia nowhere else to be found, by which the relations of animal and vegetable life are brought into harmony, constituting one grand system of organisms for the development and improvement of both animal and vegetable life. No man since the days of Thomas Andrew Knight and Dr. Lindley, has done so much as a physiologist to advance the science of horticulture. The variations of species, upon which botanists formerly looked with indifference, have become, as it were, in the hands of this practical horticulturist, the basis of a great theory for the improvement of everything which the earth may produce. Without giving an opinion in regard to the Origin and Progress of Species, the world owes him a debt of gratitude for what he has left us in his works on fertilization by insects, on cross fertilization, on the hybridization of species, and other subjects which must have a direct bearing on the successful labors of the gardener and farmer in all future time. "No more persuasive apostle of natural theology, or more powerful advocate of the argument furnished by design and adaptation, ever lived, than Charles Darwin."

I propose, therefore, that a Committee be appointed by the Chair to present resolutions on the death of Dr. Charles Darwin.

The motion was carried and the Chair appointed Dr. Asa Gray, Mr. Wilder and Charles S. Sargent, as the Committee.

Mr. Wilder presented the following preamble and resolutions in memory of Professor Joseph Decaisne, of Paris, drawn up by Charles M. Hovey, who was unable to present them on account of illness.

The Massachusetts Horticultural Society, having learned with profound regret of the death of M. Joseph Decaisne, the eminent French Botanist and Horticulturist, and a Corresponding Member of this Society, deem it their duty to place on record their recognition of the valuable services he has rendered, both at home and abroad, in the elevation and advancement of the science to

which he was devoted. Entering the Museum of Natural History and Academy of Sciences of Paris in 1826, as a garden boy at the age of eighteen, by his assiduity, observation, and perseverance, aided by Monsieur Adrien de Jussieu, he became so thorough and eminent in his studies, that in 1851 he was placed at the head of the department previously occupied by the learned M. de Mirbel. He was a correspondent of the "Revue Horticole" and of the "Flore des Serres" from 1846 to 1851, and during that period, in connection with M. Naudin and M. Le Maout, published several valuable works on Gardening and Botany. But his crowning work was the "Jardin Fruitier du Museum," begun in 1858 and completed in 1873, a copy of which is in the library of this Society.

Therefore, *Resolved*, That while we deplore the death of so eminent a man, and the severe loss which science thereby sustains, we desire to express our high appreciation of his long and arduous labors, ever devoted to botany and horticulture in all their branches. His learned treatise on the anatomy and physiology of the Algæ, and his Flora of Timor and of Arabia, show the scope of his researches in these studies, as his Jardin Fruitier gives evidence of his extensive knowledge of our popular fruits. In the language of a French cultivator, in a notice of his death, "all the world accords to him unlimited deference, and the respectful consideration which ever surrounds the self-made man."

Resolved, That these resolutions be entered on the records of the Society, and that a copy be forwarded to the family of M. Decaisne.

Mr. Wilder, in moving the passage of the resolutions, spoke of Professor Decaisne as most eminent in Botany and Horticulture, and of his personal acquaintance with him.

The resolutions were unanimously passed.

William H. Spooner stated that funds would be provided to offer Prizes for Window Gardening, similar to those offered in 1878, and moved that a Committee be appointed to take charge of the subject. The motion was carried, and the Chair appointed as that Committee: H. D. Wilmarth, E. H. Hitchings, Mrs. H. L. T. Wolcott, Mrs. E. M. Gill, Henry Ross, Mrs. C. N. S. Horner, and Mrs. A. D. Wood.

The following named persons, having been recommended by the

Executive Committee, were, on ballot, duly elected members of the Society:

WILLIAM H. BADLAM, of Dorchester.
Hon. NATHANIEL F. SAFFORD, of Milton.
THOMAS DUNN, of Newport, R. I.

On recommendation of the Executive Committee, the following named persons were elected Corresponding Members of the Society:

CHARLES JOLY, of Paris, France.
MAX LEICHTLIN, of Baden Baden, Germany.
Prof. EDWARD REGEL, of St. Petersburg, Russia.
VICTOR LEMOINE, of Nancy, France.

Adjourned to Saturday, June 3.

BUSINESS MEETING.

SATURDAY, June 3, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

A letter was read by the Secretary, from H. P. Stone, one of the Executors of the estate of George A. Stone, of Rochester, N. Y., proposing to offer a premium of one hundred dollars for the best specimens of the Pocklington Grape, to be shown at the Annual Exhibition of the Society in 1883, the premium to be awarded by the Society's Committee. It was moved by John C. Hovey, and seconded by Aaron D. Capen, that the proposition be accepted. The subject was fully discussed by William C. Strong, E. W. Wood, Hon. Marshall P. Wilder, John C. Hovey, J. H. Woodford, Robert Manning, and the Chairman of the meeting. The motion was carried, and the subject was referred to the Committee on Establishing Prizes, to fix the number of specimens to be exhibited and other details.

The chair was then taken by the President, Hon. FRANCIS B. HAYES.

The Librarian announced the donation by the Société Nationale

et Centrale d'Horticulture de France, of twenty-three volumes of its publications, and offered the following resolution, which was unanimously passed,—

Resolved, That this Society would express its gratification at the renewal of the correspondence begun more than fifty years ago by our first President, Gen. Dearborn, with the National Central Horticultural Society of France, and its thanks to that Society for the donation of twenty-three volumes of its publications.

George B. Ballard, of Hingham, and
Roscoe R. Frohock, of Malden,

having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

The meeting was then dissolved.

BUSINESS MEETING.

Saturday, July 1, 1882.

This was the day for the stated meeting of the Society, which was duly notified, but no quorum was present, and the meeting

Adjourned to Saturday, July 8.

BUSINESS MEETING.

Saturday, July 8, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

Leonard B. Harrington, of Salem.
William H. Martin, of South Boston.
George C. Woolson, of Passaic, N. J.
Carl Beer, of Groton.
William T. Hart, of Boston.

The Secretary announced the receipt of letters from H. J. Veitch of Chelsea, England, Charles Joly of Paris, Victor Lemoine of Nancy, France, and Dr. Edward Regel of St. Petersburg, Russia, accepting, with thanks, the Corresponding Memberships in the Society to which they had been elected.

Adjourned to Saturday, August 5.

BUSINESS MEETING.

SATURDAY, August 5, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Agreeably to the Constitution and By-Laws the President reported the following Committee to nominate suitable candidates for the various offices of the Society for the ensuing year: Hon. Marshall P. Wilder, Chairman; William C. Strong, William H. Spooner, Charles H. B. Breck, John C. Hovey, Charles F. Curtis, Charles N. Brackett.

Adjourned to Saturday, September 2.

BUSINESS MEETING.

SATURDAY, September 2, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee appointed at the last meeting to nominate candidates for Officers and Standing Committees for the next year, reported a printed list, which was accepted and laid on the table.

On motion of John B. Moore, it was voted, that the Nominating Committee be continued and requested to nominate candidates in place of any who may decline before the election.

The following named persons, having been recommended by the

Executive Committee, were, on ballot, duly elected members of the Society:

ROLAND WORTHINGTON, of Boston.
ROBERT BOTTOMLY, of Belmont.
CHARLES E. BRIGHAM, of Boston.
WALTER HUNNEWELL, of Wellesley.
BENJAMIN GRAY, of Malden.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 7, 1882.

A stated meeting of the Society, being the annual meeting for the choice of officers, was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Recording Secretary stated that the requirements of the Constitution and By-Laws, in regard to notice of the meeting, had been complied with.

The Chair appointed William H. Spooner, Leander Wetherell, and Josiah Crosby, a Committee to receive, assort, and count the votes given, and report the number.

The polls were opened at twenty minutes past 11 o'clock.

The Committee appointed at the Meeting for Discussion on the 7th of January, to obtain measurements and other information in regard to Large or otherwise Interesting Trees, were called on by the President, and reported progress, and an informal discussion ensued, in which many interesting facts were stated, which will be embodied in the report of the Committee. Charles W. Kennard was added to the Committee.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

FRANCIS M. WELD, of Jamaica Plain.
SAMUEL H. PIERCE, of Lincoln.
M. B. FAXON, of Melrose.
J. HENRY FLETCHER, of Belmont.
GEORGE V. FLETCHER, of Belmont.
J. PH. RINN, of Boston.

The polls were closed at twenty minutes past twelve o'clock, and the Committee to receive, assort, and count the votes, reported the whole number to be forty-three, and that all the persons whose names were on the ticket reported by the Nominating Committee were chosen. The report was accepted, and the persons named were, agreeably to the Constitution and By-Laws, declared by the President to have a majority of votes, and to be elected Officers and Standing Committees of the Society for the year 1883.

Adjourned to Saturday, November 4.

BUSINESS MEETING.

SATURDAY, November 4, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

John C. Hovey, from the Executive Committee, reported a recommendation that the Society appropriate the following named sums for the year 1883.

For Prizes and Gratuities,	
For Plants and Flowers	$1,500
Fruits	950
Vegetables	500
Gardens and Greenhouses . . .	100
For the Committee on the Library, for the purchase of Magazines and Newspapers, binding of Books, continuing the Card Catalogue of Plates, and the Incidental Expenses of the Committee . . .	400
For the Committee on Publication and Discussion	150
For the Expenses of the Committee of Arrangements	300

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid on the table until the first Saturday in January.

On motion of Hon. Marshall P. Wilder, J. W. Manning was added to the Committee on Large and Interesting Trees.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

JOHN A. DEMAR, of Lexington.
HENRY L. SIMONDS, of Lexington.
CHARLES F. SMITH, of Concord.

Adjourned to Saturday, December 2.

BUSINESS MEETING.

SATURDAY, December 2, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

T. Otis Fuller, of Needham, and James Hewins, of Medfield, were proposed as members by William H. Spooner.

The Annual Report of the Committee on Plants and Flowers was read by William H. Spooner, Chairman.

The Annual Report of the Committee on Fruits was read by E. W. Wood, Chairman.

The Annual Report of the Committee on Vegetables was read by Charles N. Brackett, Chairman.

The Annual Report of the Committee on Publication and Discussion was read by Benjamin G. Smith, Chairman.

The Annual Report of the Committee on the Library was read by William E. Endicott, Chairman.

Robert Manning read his Annual Report as Secretary and Librarian.

These reports were severally accepted and referred to the Committee on Publication.

The President, as Chairman of the Executive Committee, reported the List of Prizes to be offered for the year 1883, with the approval of that Committee. The report was accepted, and

the list was laid on the table for two weeks, for examination by the members.

Benjamin G. Smith, Chairman of the Committee on Publication and Discussion, announced that the first of the series of Meetings for Discussion the present season, would be held on the next Saturday at 11 o'clock.

Adjourned to Saturday, December 9.

BUSINESS MEETING.

SATURDAY, December 9, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Hon. Marshall P. Wilder announced the death of Henry Winthrop Sargent, an Honorary Member of the Society, at Fishkill-on-the-Hudson, and moved the appointment of a Committee to prepare memorial resolutions. Mr. Wilder spoke of Mr. Sargent's interest in arboriculture and landscape gardening as such that he might be called a tree scientist. He was a friend and neighbor of A. J. Downing, and after the death of the latter, Mr. Sargent edited two editions of his work on Landscape Gardening, adding largely to it, especially in the descriptions of new and beautiful trees. Mr. Wilder's motion was carried, and the Chair appointed him, with Charles M. Hovey and Charles S. Sargent, the Committee to prepare memorial resolutions.

Adjourned to Saturday, December 16.

MEETING FOR DISCUSSION.

HORTICULTURE IN MEXICO AND CENTRAL AMERICA.

By JOHN E. RUSSELL, Leicester.

Mr. Russell said that when the Committee called on him to open the series of meetings, he was about leaving to attend the country

meeting of the Board of Agriculture, from which he had just returned, and consequently he felt embarrassed on account of want of time for preparation. Though he had for the last ten years been engaged in agriculture rather than horticulture, as the executive officer of the State Board of Agriculture he looked upon this Society, which antedates the Board by many years, as a part of the system of agricultural instruction in the Commonwealth. As he approached this building he saw in it an evidence of the advance of horticulture, and a part of the result of that progress. Though crowned by Ceres, the goddess of Agriculture, with the deities of Fruits and Flowers below, this does not indicate any superiority of the first over the others, for they are on an equality with her. Horticulture is the perfection of agriculture — it is a fine art, producing not only objects of utility, but of beauty, and bringing us back to the state in which man was placed by the Creator.

The early Norsemen hailed the coast of Massachusetts as Vineland, and Edward Winslow wrote home from Plymouth, in 1621, that this was a land of vines, as well as of berries and roses. Here, also, Winslow saw that miracle of vegetation, the Indian corn, with its arching leaves, its towering plume and tuft of silk, the most valuable of all tropical plants, brought from the tropics we know not how, loading the board of nations that would otherwise perish, producing in our own country the present year a crop of two thousand millions of bushels in one hundred days from the seed, and adding every day of its growth from seven to ten millions of dollars to the wealth of the country — a wonderful triumph of agriculture.

This Society has been prominent in aiding the progress of pomology; hundreds of new fruits have been introduced into cultivation by those who are here today: and it is a greater honor to introduce one new and good fruit than to wear the laurels of the conqueror. The work carried on here will have no cessation. Other Wilders, Hunnewells, Moores, and Hayeses will arise and

> "Feed the kindling flame of art,
> And steal the tropics' blushing spoil,
> To bloom on Nature's icy heart."

The dahlia was introduced into Europe early in the present century. When the speaker was a boy, it was thought pretty good

gardening in the western part of this State to get dahlias in bloom before frost; but now they bloom much earlier. They are natives of the table lands of Mexico, where the speaker saw them in the single form, which they always bear in their wild state, and which he thought much more beautiful than the double forms into which they have been improved by cultivation, and this opinion has gained ground of late, for premiums have been offered for single dahlias. In Central America he noticed that double flowers invariably and immediately returned to the single form. All plants which are biennials here, seed the first year there. He attempted to acclimate the vegetables of this latitude there, but without success. Potatoes from California returned to their original habit the first year, and produced tubers not larger than marbles. Cabbages and other plants of the genus Brassica shot up like palm trees, and went to seed in a few weeks. The climate does not vary materially from our summer climate, but it seemed to him as though the native plants told these new-comers that there was no need to lay up a store of food, but that all they had to do was to go ahead and ripen their seed. Indian corn takes about as long a time to ripen there as it does here — say, a hundred days — and in the dry season becomes fodder, which forms almost the entire food of the cattle. Potatoes give only one crop there, though he had seen two crops grown here in one season. This year the growing season here consisted of two summers, with a dry season interjected between, which checked growth almost as much as a winter, in this respect resembling the tropical climate, where a dry season comes between the wet, growing seasons.

The exports of Mexico are of very small amount in proportion to the population of about nine millions. The people are not industrious, and the products are not valuable. The coffee tree is one of the most valuable productions. In its natural state it grows on dry, even arid, land, and produces the best quality of coffee on such soils, while that grown on low, moist, rich land is inferior. The so-called "male berry" grows at an elevation of about 3,000 feet above the level of the sea. The high table lands in the southern part of the country are well adapted to its growth. They are, however, too high for the sugar-cane, which requires rich, warm, bottom lands. These also are found in the southern part of the country, and there it can be grown year after year. Cochineal is abundant; the cactus on which the insect which pro-

duces the dye is found flourishes well. Corn cannot be grown as well as in the northern part of the United States. The greater part of the indigo used in this country comes from San Salvador in Central America. The manufacture of this dye requires a great deal of careful and skilful technical work, and hence its cultivation is not likely to become extensive. The agriculture of Mexico has been much injured by the many revolutions, which forced the laborers away from the haciendas into the army and thus brought about a slovenly condition of agriculture. The country may be described in the words of the missionary hymn, "Every prospect pleases and only man is vile." A sea-captain, who had traded to Mexico, when asked about the manners and customs of the natives, replied that their manners were bad and their customs were nasty. Here the speaker saw the spectacle, which would be incredible to temperance reformers, of a people absolutely abandoned without whiskey. In Mexico and Central America drunkenness is little known.

Mr. Russell did not think apples could be grown in Central America, even on the highlands. Peaches can be grown; he saw them dried and pressed into boxes, and called Mallacatones by the Indians. Figs grow in every part, and pineapples in many parts. The pineapples of commerce compare with those ripened on the plant as a wild pasture apple compares with a Baldwin. Oranges are produced wherever the ground is not too high. Grape vines in Central America grow most luxuriantly, but produce no fruit.

The remainder of Mr. Russell's address was on the railroads and canals projected to unite the two oceans. At the isthmus of Darien the continent is pinched together so as to be only forty-seven miles wide, but Mr. Russell did not believe that the canal which they are pretending to excavate there would be built in this generation. It is too far south. The Tehuantepec route was indicated by Cortez for a canal with locks; it is not subject to earthquakes, which would make a canal across Nicaragua impossible. The speaker thought there was more probability of a railroad there than of a canal. The harbor on the Pacific side is very open, and the bay or roadstead is called Ventosa; the winds are tremendous, and a very extensive breakwater will be required. The distance from New York to San Francisco is fourteen hundred miles less by this route than by the Panama route. The Panama Railroad was pronounced by Lieutenant Maury, at the time it was built, a

commercial mistake. The harbor of Aspinwall is so vexed with currents that it is extremely difficult for sailing vessels to enter it. Once, when the supply of ice was exhausted, the Tudor ice-ship came in sight, but was carried too far south and obliged to return almost to the Windward Islands, and they did not see her again for two or three weeks. On the Pacific side is the region of the "doldrums," or calms, where a vessel may lie for weeks, within twenty or thirty miles of the shore, with her sails flapping.

On motion of Mr. Wilder, the thanks of the Society were unanimously presented to Mr. Russell for his interesting address.

The President announced that the subject of the next meeting would be "Garden Vegetables—What new varieties deserve special mention? What foreign varieties are worthy of being introduced for cultivation?"

BUSINESS MEETING.

SATURDAY, December 16, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The List of Prizes for the year 1883, reported at the meeting on the first Saturday in December, and then laid on the table for two weeks, was taken up, and, after some amendment, was adopted.

On motion of E. W. Wood, Chairman of the Committee for Establishing Prizes, it was voted that that Committee be authorized to add to the Schedule any Prizes for which the means may be provided outside of the funds of the Society.

The Secretary presented an invitation from Parker Earle, President of the Mississippi Valley Horticultural Society, to the members of this Society to attend the Annual Meeting of the first-named Society, at New Orleans, February 21 to 24, 1883. The thanks of the Society were voted for this invitation, and the Secretary was directed to communicate the same.

Adjourned to Saturday, December 23.

MEETING FOR DISCUSSION.

GARDEN VEGETABLES,—THE NEW VARIETIES DESERVING SPECIAL MENTION, AND THE FOREIGN VARIETIES MOST WORTHY OF BEING INTRODUCED FOR CULTIVATION.

Benjamin P. Ware, who had been appointed to open the subject, said that he was conservative in regard to the introduction of new varieties. They are not necessarily better than the old kinds. When first introduced they are cultivated with special care, which is not always continued when they become common, and hence they do not always keep up their reputation. He intended to speak only of varieties which, though of recent origin, have been tested and have established a reputation. He began with squashes, naming first the Butman, a variety of American origin, and very fine in some respects; handsome and having fine-colored flesh, of excellent quality, and a good keeper. It makes a very handsome appearance at fairs, and is desirable for amateurs, but will not stand the test for farmers, not being sufficiently productive. The Marblehead squash is new in one sense. When the speaker began cultivating the Hubbard, he soon found the squashes were of two colors; one, the true variety, was dark green; the other was of a bluish color. The latter he did not like, and accordingly bred it out by careful selection of the true kind for seed. A gentleman in the West took a different course, and bred out the dark ones and saved the blue ones until the type was established. Mr. Gregory's attention was called to the latter, and he introduced it to the notice of cultivators under the name of Marblehead. It keeps well, and generally commands a higher price than the Hubbard. Like the Butman, it is desirable for amateurs and fairs, but it is not a good cropper, and not the kind the farmers want. The Essex Hybrid is a very remarkable variety, originated by Aaron Low, of Essex, from a cross between the Turban and Hubbard. It combines the form and fine quality of the Turban with the hard shell and long keeping of the Hubbard. It is a rapid grower, and may be planted as late as the 4th of July, or in connection with a crop of early potatoes. Mr. Ware recommended, when the potatoes are planted, to leave every fourth row vacant, and afterwards to plant the squashes four feet apart. Early potatoes can be dug without

interfering with the squashes, and if they are not dug until autumn, the squash vines keep the soil around them cool, so that they are not injured by remaining in the ground. Another advantage of late planting is that the maggot, which in many parts of this State is the worst enemy of the squash, can be avoided thereby. The fly has probably deposited its eggs elsewhere before the late squashes are ready. Another preventive of this insect is, after the vines are well set and have begun to run, to draw the earth over the root to the depth of six inches, and two feet in diameter. This will not injure the vines. Mr. Ware said he had not tried this, but was told of it by a friend, whose authority he considered trustworthy. The American Improved Turban is the best early squash, not excepting the Marrow.

Mr. Ware said that, coming from Marblehead, he could not omit to speak of the cabbage crop, which, at a meeting of the farmer's club there, was decided to be the most profitable farm crop. Fottler's Improved Brunswick is of German origin, but improved in this country. The original Brunswick was the best early cabbage, and Mr. Fottler has sold the seed of his improved variety for its weight in gold. It has now had a run of some years, and has gained in size but lost in earliness. It is not so solid as some, but shows well in the market. It was formerly preferred in Marblehead to the Stone Mason, but now is found less reliable. The Stone Mason was raised about forty years ago, from a package of seed received from the United States Patent Office, by John M. Ives, of Salem, who gave some to John Mason, of Marblehead. This produced about twenty varieties, one of which Mr. Mason liked the looks of so much that he saved and improved it. It was afterwards improved by John Stone of Marblehead, and thus acquired the name of Stone Mason. The speaker thought it perfectly reliable, and the best variety ever introduced. It makes solid heads, of excellent quality. It is not as early as Fottler's. The old Savoy cabbage was of fine quality, but very uncertain in heading, and made large stumps. The American Improved Savoy, Mr. Ware thought, was improved from the old variety in the vicinity of Marblehead. It preserves the fine quality of the original, and has a small stump and a large head, and is now thoroughly established.

The farmers of Essex County have grown many carrots, and finding the Long Orange too long, and the Early Horn not

productive, have, by careful crossing and selection, gained an Intermediate variety with small tops, of which the speaker had raised thirty-five tons on an acre, and can calculate on twenty-five. It is thoroughly established as a valuable acquisition. Mr. Ware said he had been compelled to dwell more than he desired on Essex County productions, but the Marrow, Butman, Hubbard, and Low's Hybrid squashes were all originated or improved in Essex County, as were also some of the cabbages recommended.

All appreciate the value and importance of a succession of green corn. The early varieties formerly raised were not sweet, but now we can have sweet corn from the earliest ripening to frost. The Marblehead is earlier than any other, even the Narragansett or Minnesota. The stalks are small and the ears are produced near the ground. Mr. Ware recommended to plant three or four varieties, of different degrees of earliness, at the same time, and a few weeks later to plant again; and in this way two plantings would be sufficient to ensure a supply. A good succession is Marblehead, Crosby's Early, and Moore's Early; and for late, either the Marblehead Mammoth, Burr's Improved, or Stowell's Evergreen.

The subject of Potatoes is difficult to handle, because so many new varieties are introduced every year. Since the Early Rose was raised, and sold for three dollars a pound, and a cow was given for a single tuber, the farmers have seemed to be crazy on the subject, and the country has been flooded with new varieties, many of them seedlings from the Early Rose, and some of them, the speaker thought, better. Burbank's Seedling, which originated in this State, is a better cropper than the Early Rose, white-skinned, and of excellent quality, which it retains late in the season. It is a thoroughly established variety. The Early Ohio is earlier than the Early Rose, productive and of good quality, with all the requisites of a first-class variety. Goodrich's Seedling was originated in Haverhill, Mass., by the cultivator whose name it bears. It took the prize of twenty-five dollars, offered by the Essex Agricultural Society for the best seedling potato after a trial of three years. It is early, a strong grower, a good cropper, keeps well, and is of good quality. All the above-named potatoes are seedlings of the Early Rose. So also is Clark's No. 1, which originated in New Hampshire, and resembles its parent; it is

of excellent quality and a great yielder. The Belle is a newer variety; several gentlemen, who have carefully tested it in competition with twenty of the best varieties, claim for it better qualities than are possessed by any other. It is very productive, and remarkable for uniform size, of pinkish color, long, oval, somewhat flattened, and keeps its quality late. It is sometimes difficult to decide which potato is the earliest; a few days' greater earliness does not amount to much and may not exist. If quality must suffer for the sake of earliness, the latter is not of much account; we should study for quality first.

Of Tomatoes the Paragon and Acme are the best; for the table the Paragon is ahead of any other.

Among Peas, the American Wonder, which originated in Canada, from a cross between the Champion of England and the Little Gem, is rightly named. It is the greatest acquisition lately gained among peas. The vines are very small, but bear more peas than large vines. The peas are sweet and wrinkled. A succession of green peas is necessary to a perfect table, and Mr. Ware secures this as with corn, by planting three or four varieties ripening in succession. The Dan O'Rourke, or any of that family, may be taken as the standard for earliness; after that may come the American Wonder, then McLean's Advancer, and then Champion of England. If these are all planted at the same time, three plantings will be sufficient. The late ones are not very reliable, being apt to mildew; but it is worth while to make the attempt to raise them, for nice green peas late in the season are a great luxury.

Of Turnips, Mr. Ware recommended the White Egg, as most reliable for a crop. Formerly, the Purple Strap Leaf was thought best, but the White Egg is now preferred, though it is not quite so early as the Purple Strap Leaf. It belongs to the class of flat turnips, is handsome, large, tender, and sweet, and a valuable acquisition as a fall variety. Mr. Ware closed by repeating that he had not attempted to speak of other than established varieties.

Hon. James J. H. Gregory was next called on, and said that, from his position as a seedsman, he was embarrassed in speaking on the subject before the meeting. Yet he felt an interest in it, not only as a seedsman but as a farmer, and he wished to treat everything according to its real value. It is the business of seeds-

men to experiment with new things, and introduce such as are valuable, for cultivation. Gardeners cannot afford to plant what is not well tested. Some foreign vegetables, like the Soja bean, which is the most nutritious food in the world, and plays a very important part elsewhere, are of no value here. The Little Gem squash is valuable for amateurs, but the color is too pale for pies, and it is too small for market. The Hubbard, Butman, and Marblehead squashes were introduced to cultivation by the speaker. The Hubbard was brought into Marblehead nearly ninety years ago, as was remembered by a woman who died last year at the age of ninety-three. The Butman was originated by Clarence Butman, of Maine. Mr. Gregory's account of the origin of the Marblehead was that it was brought from the West Indies by Skipper Sam Stanley, therein differing from Mr. Ware. A gentleman at the West sent Mr. Gregory a squash resembling Stanley's. When the Hubbard was first cultivated, we had also the Middleton Blue, a South American variety, and the two got mixed, and this was the origin of the Blue Hubbard; the Marblehead, though resembling this in color, is an entirely distinct variety. The Butman and Marblehead do not yield as well as the Hubbard, but the Butman is superior in quality to any other squash grown, and the speaker advised its cultivation, believing that it would bring the price that it is worth. We should not throw away a good thing because it is not immediately profitable. We have around Boston the best market gardening in the world in some respects; and we want to get the finest specimens of fruits, and the same with vegetables. When the Hubbard squash and Early Rose potato were first offered to the market-men they were rejected. He always expects to grow finer melons in his own grounds than can be got in the market. He had several times made the cross between the Turban and Hubbard isolated, which produced a squash now known as the Essex Hybrid, but the progeny sported so much that he did not think it wise to introduce it. He thought Mr. Ware's informant was mistaken in regard to preserving squash vines from injury by the maggot, by covering with earth. Possibly it might add to the vigor of the vines, and so enable them to withstand injury by the maggot. But the maggots are found all along the vine. He had taken nineteen out of one vine.

The original seed of Fottler's Brunswick cabbage came from Benary, the German seedsman, and we have not got far from the

original. The Stone Mason cabbage has one fault, which is more noticed by seedsmen than by farmers,—a tendency to rot at the stump. The American Improved Savoy came originally from Comstock, of Connecticut. The Burbank's Seedling potato was originated by Luther Burbank, of Lunenburg, to whom the speaker paid one hundred and fifty dollars for the stock, and after whom he named it. It is decidedly later than the Early Rose. We need early varieties of potatoes, as they are less liable to injury by the potato beetle, the last brood of which is the worst. The Early Ohio was raised by a Mr. Reese, of Ohio, and is a standard early variety in the West, and first class here on low land. The Belle is no better cropper than the Late Beauty of Hebron; it is much like the White Elephant.

The Marblehead Mammoth corn originated from a very long ear of sweet corn obtained in Messrs. Burr's seed store; by years of careful selection it has become a very early mammoth variety. The Marblehead Sweet corn was gained by selection from the Narragansett, and was not originated in Marblehead. Potter's Excelsior is white and sweet.

The American Wonder pea, Mr. Gregory thought quite as early as the Dan O'Rourke. The Hancock's Early pea is the best of the early yellow hard peas, and gives the most satisfaction. Laxton's Earliest and Ferry's First and Best have proved identical. A cross has been made between the Alpha and American Wonder, but it is not yet fixed. The John Bull pea is very large podded, and has large peas, filling out the pods well. The vines and leaves are stocky. It is the best of the stocky peas, which do not generally fill out well. Carter's Stratagem is desirable for amateurs. Ours is not a pea climate like the moist, cool climate of England.

The White Egg turnip is a first-class variety—new and very distinct. The Early Munich is earliest of all, and a decided acquisition. The Extra Early French turnip was recommended by the speaker for trial. The Improved White Spine Cucumber is different from the common White Spine, and an improvement on it. Tailby's Hybrid is a fine kind; it has given great satisfaction. In England they like smooth-fleshed cucumbers without seeds, such as the last named. The Marblehead Early Horticultural bean is the earliest of all the bush varieties; it resembles the Bush Horticultural. The speaker also recommended the Broad Wax Pole bean.

The Cuban watermelon is the same as the Excelsior, and quite desirable. It weighs from forty to seventy pounds. The Long Hill watermelon is fairly early. The Valencia melon is a yellow-fleshed variety, rather late. The Surprise muskmelon is yellow and very delicious.

William D. Philbrick said that Henderson's Early Drumhead cabbage is so early that it may be followed by a crop of squashes. It is more solid than the Wyman and larger than the Wakefield. He inquired about the cultivation of Brussels sprouts and Sea-kale, which are unknown in our markets, though grown in the gardens of amateurs.

President Hayes said that he cultivates Brussels sprouts, and would have them for some months. Sea-kale had not done so well with him.

C. M. Atkinson said that the natural soil for Sea-kale is a deep sand, but he preferred a sandy loam trenched two and a half feet deep, and well enriched. Permanent beds should be laid out four feet wide, with eighteen-inch alleys. The seed should be sown in bunches in two rows six inches apart in the centre of the bed, and the plants two feet apart in the row, each plant opposite the space between two in the other row. Each bunch should be thinned to one or two plants. Just before the ground freezes in the fall, take the soil from the alleys, and place on top of the bed, covering the crowns of the plants from nine to twelve inches in depth. Then fill the trenches or alley-ways with strawy manure or leaves, and cover over the bed with the same material. If desirable, as soon as the very severe weather has passed, hot manure may be substituted for the strawy material in the alley-ways. In this way he had cut it in England from Christmas onward, and here in April. In favorable seasons it will require no aid from hot manure. As soon as the crop is cut, the manure should be removed from the alleys and the soil replaced, and the crowns cut clear over if they have become hollow or too high. After the cut-over crowns have begun to grow, go over them and remove all superfluous crowns, as sometimes each crown will form four or five more than are necessary. Experience will discover many little items that go to make success.

For market sow in rows four feet apart, and thin out to twelve or fifteen inches apart, and when large enough, lift and heel in as thickly as possible and level with the soil, just as they grew.

A frame four feet wide and ten or fifteen feet long will hold the root produce of a very large patch of land. If outside, cover with a span-roofed frame and movable shutters, for examination and gathering the crop. A warm dark compartment in a cellar or a mushroom house is a very good place for forcing.

For new plantations the side rootlets that are broken off in lifting for forcing may be cut in pieces an inch or two long, scattered over a plain surface, and covered with sandy loam, and protected from severe weather for the winter. Each piece will form a plant, which should be planted as early as possible in spring, and, when large enough, lifted and forced as before directed. For forcing, it is necessary to make a new plantation every year, as the lifted plants are worthless. Beds made as first described will last indefinitely. James Veitch and Son offer a new variety, the Lily White, which they recommend as more easily produced than the common kind, and not liable to be injured by exposure.

Mr. Atkinson said he had grown the Dan O'Rourke pea for the last time. The American Wonder is much superior to Carter's First Crop, and there is hardly twenty-five minutes' difference in their season. After the first planting he would plant only Champion of England.

Hon. Marshall P. Wilder had been very much interested in what had been said by Messrs. Ware and Gregory, and felt great gratitude to them for their right-down personal and practical observations, which are worth their weight in gold. He made it a rule to try everything advertised with a fine, flowing, encouraging description. He had planted ten or fifteen varieties of peas, and kept a record of the time when they were fit to use, and found Dan O'Rourke a little the earliest. Breck's Excelsior is a splendid variety, about as early as Dan O'Rourke. His selection of peas would be the same as Mr. Ware's,—Dan O'Rourke, American Wonder, Advancer, and Champion. He had found the Marblehead Sweet corn the best for early, and followed it with Crosby's, Moore's, and Stowell's; he had the last almost every day until the sixth of November. He had tried all kinds of tomatoes and settled down on Acme and Paragon. Gen. Grant is good, and Mayflower promises well; it is perfect in form and solidity and of good flavor. Livingston's Perfection is no improvement; it has an unpleasant flavor. Mr. Ware's statement in regard to the Essex Hybrid squash is correct; the speaker has it on his table

now. It is a fine keeper and cropper, and, with the Hubbard, will carry you through the season. The idea of keeping away the maggot from squashes by piling earth over the root is fallacious. The plant will root as it goes along, and the true method is to wait until the insect has passed.

John B. Moore could not conceive how any one could eat any other than a wrinkled pea. The American Wonder is all that has been claimed for it, and so nearly as early as the Dan O'Rourke that it is not worth while to cultivate the latter. McLean's Advancer is good. Yorkshire Hero is more satisfactory than the Champion of England; it is of as good quality, a better cropper, and not so tall.

Mr. Atkinson said that the Marvel pea supersedes the Advancer; it is an excellent cropper. The American Wonder is suited to the smallest gardens; the rows may be made only fifteen inches apart.

Mr. Gregory said that the Egyptian corn is later than Stowell's. He tried the American Wonder pea two seasons before getting anything out of it. Mr. Moore is right in regard to the Yorkshire Hero pea. Hare's Dwarf Mammoth is a splendid family pea. The Arlington melon resembles the Casaba. Livingston sent out the Acme and Paragon tomatoes mixed.

Mr. Philbrick said that the early hard yellow peas, like Dan O'Rourke, will grow on poor sandy land and come to perfection before the summer droughts. The wrinkled peas, like the American Wonder, must have a moist soil or they will suffer from drought.

It was announced that the subject for the next Saturday would be, "How much has the Tomato gained in earliness during the past twenty years, and how has the gain been secured? Which is the best variety for market and which for amateur use? What is the best method of growing and keeping Celery for winter use, and what is the best variety?" To be opened by William D. Philbrick.

BUSINESS MEETING.

SATURDAY, December 23, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President read a letter from A. H Héron, Vice-President and Acting President of the Société Centrale d'Horticulture du Département de la Seine-Inférieure, announcing the death of M. Henri Courcelle, President of that Society.

The Secretary read the following letter, which was referred to the Committee on Publication and Discussion.

December 1, 1882.
THE SCIENTIFIC ROLL OFFICE,
7 Red Lion Court, Fleet Street,
London, E. C.

Secretary. ROBERT MANNING,
Mass. Hort. Society:

My Dear Sir, — I have received the Transactions of your Society for 1882, Part I, and return my hearty thanks therefor. I have hastily skimmed through its pages, and have been much struck with what was said by Professors Goessmann and Penhallow, and the Hon. Marshall P. Wilder.

If I might be allowed to make any suggestion, I would state that I feel sure some practical result would accrue if the yellows in the peach were submitted to a thorough and exhaustive examination from every point of view — chemical, microscopical, practical, and every other. Let it be resolved that an attempt be made to cure the yellows disease or prevent it. Let the best men be selected, and let no necessary expense be spared, and in less than ten years, if the matter is persistently and energetically pursued, very little will be heard of the yellows, and the nation will have saved a good deal more than it has spent. As a preliminary starting point, a short digest of the present state of the question should be drawn up and circulated amongst all orchardists, with a request that they help, either by observation or experiment, or monetary contributions. The experts will soon find their attention restricted to a few well-defined points, and will be able to suggest to growers a

few crucial tests, which will show the cause of the disease and the method of curing or preventing it. If the matter is taken in hand, I need hardly say I shall be highly pleased to help in every way I can.

I have sent Nos. 1 to 9 of the "Scientific Roll" to you.

I am yours faithfully,

A. RAMSAY.

Adjourned to Saturday, December 30.

MEETING FOR DISCUSSION.

HOW MUCH HAS THE TOMATO GAINED IN EARLINESS DURING THE PAST TWENTY YEARS, AND HOW HAS THE GAIN BEEN SECURED? WHICH IS THE BEST VARIETY FOR MARKET AND WHICH FOR AMATEUR USE? WHAT IS THE BEST METHOD OF GROWING AND KEEPING CELERY FOR WINTER USE, AND WHAT IS THE BEST VARIETY?

William D. Philbrick, who had been appointed to open the discussion, did not think that any gain had been made. Eighteen or twenty years ago it was not uncommon to have tomatoes by the tenth of July. But though he doubted whether anything had been gained in earliness, he did think that much has been gained in quality. The Boston Market was, when introduced, the best variety. It is valuable for its earliness and great productiveness, but is rather hollow and seedy, and is now subject to blight, and is going out of favor. The Paragon is gaining in estimation, and is destined to supersede it. Earliness in tomatoes and other vegetables is not so much an object to market gardeners as formerly. All early vegetables are expensive to produce, and gardeners here cannot compete with Southern gardeners in raising them. The Paragon was, when introduced, rather late, but by careful selection of the earliest, as well as the fairest and best specimens, it has been brought two or three weeks earlier. The speaker knew no other way of gaining in earliness than this, and careful handling of the plants. Formerly, tomato seed was sown from the middle to the 20th of February, and the plants were pricked out a month later, and transplanted two or three times afterwards—a very laborious method, now abandoned.

They are now started nearly a month later, and kept growing rapidly, and the fruit is matured quite as early, They do not bear a check, such as is caused by too frequent transplanting or a chill. If they are checked in growth they are apt to blight, and though the product will mature early, it will be small.

As to varieties, the Paragon is decidedly the best for market. It is large, has but few seeds, and bears abundantly. It is more vigorous and healthy than almost any other variety. The Acme is preferable for amateurs, as it is finer flavored, but it is more subject to blight and is not a large cropper. There are many other kinds highly recommended, but the speaker confined himself to such as have been tested.

Celery requires very rich land in fine condition. It is usually grown as a second crop in an onion bed, every sixth or seventh row being left vacant for celery. It requires a long time to grow, and the seed should be put in as soon as the ground is mellow. It was formerly transplanted twice, and this method is still pursued by those who wish to use the ground for an early crop; but the speaker objected to it on account of the check which it gives the plants. He is obliged to transplant more or less, but he sows and thins out, and transplants. If not kept growing, but checked by transplanting, or dry weather, or weeds, it is apt to run to seed. It is much more troublesome in this respect than it used to be. Many persons think this habit is owing to the seed-growers' producing seed in one year, by sowing in January or February, and transplanting twice. The speaker was of this opinion, but some older gardeners think it does no harm. Another point in which the cultivation at present differs from that formerly practised, is that now it is planted on the surface of the ground, instead of in trenches. Formerly the earth was drawn up around it, from time to time, so as to produce long stems without sprouts. Now it is thought better to do the earthing at two operations, ten or fifteen days apart, after the plants have made a stocky growth, and are ready for blanching in autumn.

The ordinary method of keeping celery is in a pit from six to twelve feet wide, lined with planks, which are kept apart by braces. It should be covered with boards having a slope of about two inches to the foot, and these with whatever kind of litter is most convenient. The Arlington growers use dried eel grass; forest leaves are good. The celery must be cooled off after being placed

in the pit, and the temperature must be kept as near freezing as possible. If there is frost on the under side of the boards, but not in the pit, it will be about right. If too warm it must be aired, but if not too warm it is better not to air it. The atmosphere of a cellar is too dry. For a small quantity, the best way is to dig a trench in the ground, and cover with earth and then with boards to shed the water, and the whole with litter a foot deep and two or three feet wider than the trench, to keep it from freezing. It is some trouble to get at the celery when the litter is frozen, but it is worth while for so great a delicacy.

In regard to varieties, the only kind the market-men here will look at is the Boston Market. The last season, some of the Crowfoot variety was brought in; it came early and met with favor at first, but afterwards customers became dissatisfied with it. The crop here was not good, and a considerable quantity was brought from Cincinnati and other points in the West, in long bunches of twelve roots each, which sold for fifty cents, while the Boston Market, raised here, brought from two dollars and a half to three dollars per dozen, at wholesale. The favorite variety is to a certain extent a matter of fashion. In New York, they tie two or three small roots together and sell them cheaper than we can here. Henderson's Solid is a favorite variety there; it is dwarf, with no side sprouts, and can be planted thickly. Here it is the fashion to have side sprouts, and Henderson's, when tried, did not sell well. There is a sub-variety of it, of a pink color, which is a little ornamental.

In answer to inquiries, Mr. Philbrick said that when the celery is placed in the pit, enough earth should be put around the roots to keep it from wilting. A trench a few inches deep is dug across the end of the pit, and another trench formed by throwing the earth from it into the first trench, after the roots are placed in it, and so on. The plants should not be crowded, but, as the growers say, room enough should be left for a rat to run between them. A considerable quantity of celery is grown in drained swamp land, but pure peat is not best; if there is no mixture of loam, it is subject to drought, even with the water near the surface, and celery suffers very quickly from want of water. In such a case, the surface is rolled to prevent evaporation. But more celery is lost from want of manure than from want of moisture. Few are aware how much manure it wants. The Arlington growers apply from fifteen

to twenty cords per acre before planting, and, afterwards, when the celery has attained some size, open a furrow alongside, and put in fine manure and turn the earth back again. It does well on the same land year after year; the frequent cultivation and high manuring bring the land into fine condition. In Arlington, they use horse manure, and water the celery.

Josiah Crosby said that some meadow land is favorable to the growth of celery, and some is not. It needs a great deal of moisture. He thought it was better on low land, if the consumers are any judges.

Hon. Marshall P. Wilder liked what Mr. Philbrick had said; it is the result of long and careful experience. The speaker said that he tries all the new kinds. Among those which he has tested, are Henderson's and Sandringham, but none come up to the Boston Market, which he believed to be the best variety on this continent. If allowed to grow too grossly, all kinds become pithy. He thought it best to grow it in the open soil and give it one transplanting. It does best planted late in very rich land. It is astonishing how much manure it will take. For early use, he banks it up with seaweed and boards, where it grew, and afterwards stores it for winter.

Mr. Philbrick said that celery is profitable if well grown. The Arlington growers depend largely on it, and no doubt find it profitable, but it does not follow that others would. A compost of horse manure, night soil and street sweepings is excellent for it.

W. W. Rawson said that he transplants all his celery, and shall continue to do so. He considered the Boston Market the best variety, though other kinds might be as good. The seed here is getting old and running out. He has sown as early as the first of April, but for the last ten years not before the 6th of April, and he markets most of his crop before Thanksgiving. There is nothing better for it than horse manure; he uses a thousand cords on thirty-five acres of land. He had tried many kinds of tomatoes—the Paragon, Acme, Canada Victor, Boston Market, Alpha, and others, and had found the Boston Market earliest. The earliest tomatoes he ever marketed were two years ago, when he carried in a bushel on the 10th of July, which he sold for ten dollars. This year he carried in thirty-five bushels about the 15th of July, for which he got two hundred dollars. Individuals would have preferences in regard to the quality of the different varieties. He had

found lettuce, cucumbers, cabbages, and celery profitable in the order named.

J. W. Manning spoke of a gentleman at Fall River, who, instead of earthing up his celery, blanches it with meadow moss.

George Hill agreed principally with what had been said by previous speakers. The two greatest troubles in raising celery are blight and running to seed. The former sometimes ruins a whole crop. It has been known fifteen or twenty years. We did not use to have celery run to seed the first year; but ten or fifteen years ago a gentleman started a large piece of early celery which went to seed, and this seed was sold all over the country, and was, probably, largely the cause of the disposition to run to seed so much complained of. The seasons are very much the same now as they were then. The better culture celery has, the better is the chance for profit; it should be quickly grown on good soil. A deep loamy subsoil is desirable; it will stand up better on such soil than on meadow land. To keep well it must be healthy and kept cool.

Mr. Hill did not think there had been any increase in earliness in tomatoes, on the average, in the last twenty years, or so much improvement in varieties as some thought. The Boston Market seems to blight. He could not get Acme and Paragon seed pure enough to grow. Two years ago he planted the seed of a Mayflower tomato, which produced four varieties, differing in size, shape, and color; among other colors, there was that of the old Fiji tomato. Southern competition in tomatoes has been less for the last two or three years than before, as the fruit must be picked green, and the quality is far inferior to that ripened on the vines, and consequently prices have been better. When he abandoned the Boston Market tomato, he chose the Emery for market, and thought it was now more generally grown than any other. It is good enough for amateurs. The Gen. Grant is superior in quality, but he had not seen it pure for several years. It is rather small, but it is solid, and cuts clean. He prefers new seed of this and most vegetables. Cucumber and melon seed will grow when fifteen years old, but the vines are not so strong and show fruit more quickly. He prefers it not over two years old.

N. B. White said that rolling land as recommended by Mr. Philbrick is contrary to general practice. Rolled land will not absorb so much moisture at night as if the surface is loose. In his

own case he derives benefit from rolling, because his land is underdrained, and he has plenty of water below, and rolling the surface prevents evaporation of the water drawn up.

Mr. Philbrick said that celery roots near the surface, and sometimes the soil becomes exceedingly dry there, and rolling is then practised, but mostly on land with a moist subsoil, to prevent the loss of the water drawn up by capillary attraction. He did not think that night absorption is sufficiently proved.

C. M. Hovey said he had only cultivated celery in a small way for family use. He did not think the matter of rolling thoroughly settled; it might do in some instances, but pulverizing the soil would be better in the majority. When soil is not stirred, evaporation goes on rapidly, and large cracks are formed. Stirring the soil causes it to absorb moisture from the air. He had had ground so hard in July, from want of cultivation, that it could hardly be broken with a crowbar, where, in spring, a stick could be run down two feet. Strawberries on it stopped growing and became almost deciduous. The weight of testimony is in favor of stirring the soil.

The premature running to seed of celery may be from the dissemination of bad seed, as Mr. Hill had said, but the speaker thought it doubtful. The effect of bad seasons may continue for many years. In 1857 a very severe winter injured pear and other fruit trees, which was shown years after in a thin covering of sound wood on the outside, while the inside was so weak that it could be broken off. Seeds may receive injuries that may be propagated for several years.

In England, giant celery, three roots of which have weighed twenty-four pounds, is extensively cultivated. There they begin early to earth up, and continue it. Here the Arlington growers begin to earth up after the plants are well grown, thinking that if done while too young it is apt to rot. Celery likes a cool climate.

Mr. Hovey said he had cultivated tomatoes mainly for his own use, and the Trophy suited him best. It is late, and perhaps too large, but its flavor is excellent and it is almost as solid as an apple. It is rather too late for market cultivation. He thought that in some of the new varieties they had departed from the finest flavor. The Emery, Gen. Grant, and some others are much alike and continue true; others, of more recent origin, have not their qualities so permanently fixed. Livingston's Perfection

blighted, a black spot appearing in the centre. The speaker thought this would continue awhile and disappear, like some other diseases of plants and fruits.

Mr. Hill said that market gardeners in Arlington do not earth up celery all at once; it is apt to smother it, and causes blight. It is proper to earth up gradually. The wilting referred to by Mr. Hovey, on the "yellow day," in September, 1881, was probably caused by disease present before that time, and that day developed it.

Leander Wetherell asked Mr. Hill why the tomato should be expected to come true from seed, any more than the potato, which is closely allied.

Mr. Hill said that he did not expect to get so many varieties from one tomato as if he had sowed seed of several varieties from one plant.

Mr. Hovey said the seed of Trophy and Gen. Grant from the seed stores produces only one kind. The Mayflower is not yet fixed; the others all come true.

Mr. Hill had found the tomato the hardest vegetable to improve by crossing or otherwise. The Trophy is fine for canning.

Mr. Wetherell said the Early Rose, Peerless, and Prolific potatoes were all from the Chili. The tomato is nearly allied to the potato, and the speaker did not see what reason there is to expect a different result in raising seedling tomatoes from that found in raising seedling potatoes.

Mr. Hill's experience had been the same with regard to the tomato; he had found the same sporting habit.

J. W. Talbot said that every ovule has to be fertilized by a male cell, and if there is no other plant near, the product of the seeds will be all alike, and all the same as the parent. If two kinds of tomato, say the Trophy and Gen. Grant, grow near each other, every ovule on the Trophy fertilized by a Trophy cell will reproduce the parent, but every ovule fertilized by pollen of the Gen. Grant will vary.

Mr. Wilder thought it possible that Mr. Talbot's view that the ovule of the tomato might be fertilized so as to bring different varieties was correct, but he had never heard of it. The variation of tomato plants, from the seed of the Mayflower, was curious. The speaker planted twelve seeds of the Mayflower, five of which produced perfect specimens. He thought we might have lost color

in getting new varieties, and that it is true we have made no advance in earliness. The tomato requires a certain amount of heat to ripen it, and cannot ripen without it. Though it has come into use quite recently, it was introduced into Salem eighty years ago. We have got rid of the old, wrinkled kinds, and he doubted whether any better kinds than we now have would be raised. The Gen. Garfield, which has weighed two and a half pounds in England, is a reproduction of one of the old, wrinkled kinds, but they do not know so much about tomatoes the other side of the Atlantic as we do here.

Mr. Hovey said that the Gen. Garfield tomato is identical with the Chihuahua, introduced about 1840 by Messrs. Thorburn, who had three or four specimens weighing two pounds each.

Samuel Hartwell said that he planted seven varieties: the Canada Victor, Gen. Grant, Boston Market, Arlington, Emery, Acme, and Mayflower, the 11th of March, under glass. Those remaining in the seed-bed after thinning were afterwards set in the field, and did better than those transplanted in the hot-bed. The Boston Market blighted least and the Acme most. The Emery was fine, but small, owing to the dry season. The Mayflower was planted in his garden, in order to give it greater care, and blighted even worse than the Acme. The Boston Market brought the most money.

Mr. Wilder thought the blight was due to atmospheric causes.

Mr. Philbrick was asked if he had ever tried training tomatoes on trellises, and replied that he had, and thought they would not do so well as on the ground. They get more warmth from the surface of the ground than on trellises. Mulching is useful in a dry season, and keeps the fruit clean. It is not practised on a large scale, and not so much as formerly.

The President announced that the subject for the next Saturday would be: "How can Melons best be grown? Is planting in drills a better way than in hills? Is the use of potash as a manure productive of higher flavored fruit? What are the failings in our vegetables, and in what direction is improvement required?"

BUSINESS MEETING.

SATURDAY, December 30, 1882.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Hon. Marshall P. Wilder, from the Committee appointed May 6, to prepare a memorial of Charles Darwin, presented the following, drawn up by Professor Asa Gray, Chairman of the Committee:

The Massachusetts Horticultural Society desires to place upon its records some expression of the great loss which horticulturists, in common with the whole scientific world, have sustained in the death of the most eminent Naturalist of the age — perhaps of any age — a Naturalist in the broadest as well as the highest sense of the term, the prince of biological investigators, of unrivalled sagacity in research and candor in exposition, of unexampled felicity in detecting the hidden meaning of things which had escaped inquiry by their very commonness, and in discerning the great importance of causes and interactions which had been disregarded on account of their supposed insignificance, thus exemplifying the true characteristics of genius.

Although the name of Darwin is most famous for his celebrated exposition of the mode and order in which plants and animals have fulfilled the command to multiply and replenish the earth, yet horticulturists will remember that some of his characteristic investigations and fruitful discoveries relate to the objects of their predilection and to the processes in which they are engaged. The interesting and important results thus obtained surely make it fitting that the Horticultural Society should pay a grateful tribute to the memory of CHARLES DARWIN.

ASA GRAY,
MARSHALL P. WILDER,
CHARLES S. SARGENT, } *Committee.*

The resolutions were unanimously adopted.

Mr. Wilder, also, as Chairman of the Committee appointed December 9, to prepare a memorial of Henry Winthrop Sargent, an Honorary Member of the Society, reported the following:

Resolved, That in the decease of Mr. Henry Winthrop Sargent,

this Society and our country have lost one of the most widely known and experienced horticulturists and landscape gardeners of America. For more than forty years he devoted his time, wealth, and talents to the introduction of exotic trees and plants, especially of the coniferous tribe, for the purpose of testing their adaptation to our climate. Mr. Sargent was the intimate friend and companion of Andrew Jackson Downing, and a co-laborer with him, sympathizing with him in his love of the beautiful in nature; and after Mr. Downing's death he published two editions, with copious notes, of his Treatise on Landscape Gardening. Mr. Sargent's experiments and teachings have been of immense and lasting benefit to the American people, and to them originally may be traced much of the inspiration which has produced those beautiful villas and ornamental grounds which surround our goodly city and adorn other sections of our country. Mr. Sargent was the son of Henry Sargent, so well known and appreciated as a historical painter, and was the last surviving grandson of Daniel Sargent, an eminent merchant of Boston in the early part of this century.

Resolved, That these proceedings be entered on our records, and that a copy thereof be sent by the Secretary to the family of the deceased.

MARSHALL P. WILDER,
CHARLES M. HOVEY,
CHARLES S. SARGENT,
} *Committee.*

President Hayes, being called on to speak on the resolutions, said that Mr. Sargent was so well known in this country and Europe that it seemed hardly necessary to say how much the world has lost in losing him. All the powers of his mind and his great energy and earnestness were bent in one direction. He was animated by the deepest love of nature, and his place was arranged with the best taste and judgment. He brought plants from all parts of the world, caring not so much for success in their cultivation as to practically test their adaptation to our climate. He was determined to make discoveries, and in this he did a great work. He was not discouraged by failure, but in his grounds are the remains of experiment after experiment. He was especially interested in the Coniferæ, and many of the species now ornamenting our gardens we owe to his zeal.

Mr. Wilder said it should be borne in mind that, though Mr.

Sargent's grounds were in another State, he was of our own blood, and spent his winters here. He had a strong sympathy with us, and his memory is among the choicest of our horticultural treasures. His object was to bring in plants that would thrive on our own soils. He inherited to a considerable extent his father's talent for painting.

The resolutions were unanimously adopted.

Mr. Wilder also made the following report:

The Committee on Old and Interesting Trees report that considerable progress has been made in the collection of information, but the completion of their work cannot be accomplished for some time to come. The interest manifested in this subject, both historically and otherwise, increases with the investigations of the Committee; and it will take much further time to collect materials for a report worthy of the Society, and creditable to the Committee who have the business in charge. They therefore ask further time.

MARSHALL P. WILDER, *Chairman.*

The report was accepted, and further time was granted to the Committee.

The President, as Chairman of the Executive Committee, presented the list of Prizes for Essays proposed by the Committee on Publication and Discussion, to be offered in the year 1883, the same having been approved by the Executive Committee.

The meeting was then dissolved.

MEETING FOR DISCUSSION.

The following paper was read by the author:

HOW CAN MELONS BEST BE GROWN? IS PLANTING IN DRILLS A BETTER WAY THAN IN HILLS? IS THE USE OF POTASH AS A MANURE PRODUCTIVE OF HIGHER-FLAVORED FRUIT? WHAT ARE THE FAILINGS IN OUR VEGETABLES, AND IN WHAT DIRECTION IS IMPROVEMENT REQUIRED?

By W. W. RAWSON, Arlington.

Melons can best be grown on land that is quite sandy and nearly new, or perhaps two or three years after breaking up. The manure

to be used should be well decomposed, and thoroughly worked in. The method of planting in this vicinity is in a bed, about the 10th of May, putting about forty hills under each sash. Some use a piece of sod to plant each hill on, so that the roots may not be disturbed in transplanting. The plants will be ready for transplanting about the tenth of June; they are then taken out of the bed and placed in rows about six feet apart, and four or five feet in the row. They are set about six inches above the level of the land, and hoed up to, so that the water from the rains may run away from the hills, as melons do not require a large quantity of water, and can be grown on very poor land. I think Watermelons will grow on poorer land than either Cantelopes or Muskmelons.

The method I have just decribed is the one practised in this vicinity, but if not particular about their coming to maturity early, they may be planted in the field; but it is about as much work to keep off the bugs when they are small as it is to transplant them, as the bugs rarely trouble them in the bed.

The land in New Jersey and on Long Island is better adapted to melon culture than our land here in Massachusetts, and the season is about two weeks earlier, so that they get them into our market before we can; and melons are not a very sure crop with us, and therefore are not very extensively grown here.

In answer to the question, "Is planting in drills a better way than in hills?" I should say that it is the best way to plant in hills, because that, by putting the hills at a uniform distance, and cultivating both ways, they can be more easily cultivated; and for transplanting it is better to have them in hills.

The failings in our vegetables, when there are any, are due to many different causes. I do not think, as a general thing, they have many failings, nor do I think that our vegetables today are poorer than they were in years gone by; but our idea of perfection is far in advance of the past, therefore it requires more experience to grow them than formerly, and they are raised in much larger quantities. But you may ask, How can this experience be obtained? and the only answer I can give is, that it must be obtained by practice. Then I will say, in answer to the last two questions, that, by a better knowledge of growing vegetables, the failings may be partially overcome, and a decided improvement may be obtained.

DISCUSSION.

In reply to inquiries, Mr. Rawson said that he uses the same fertilizer for everything — good stable manure, well decomposed. He had tried other fertilizers with the manure, but used just as much manure. Melons do not require so much manure as some other crops; they may be planted as a second crop after early vegetables.

William C. Strong thought that a large percentage of manure is lost in decomposing.

Mr. Rawson said that different crops require manure in different condition; some want it fresh, and some old. Melons are of the latter class; he had never got good ones on fresh manure; he uses the material of old hot-beds for them. They do better on land that has borne one crop, which has taken the strength of the manure.

Benjamin G. Smith said that he had grown one variety of melon, the Casaba, for ten years. His experience agreed with Mr. Rawson's. He uses well decomposed barn-yard manure largely, spread broadcast and also in the hill, and no other kind. He changes the location of his melon patch as far as possible. He sows his melons in cucumber boxes (smaller above than below, and without bottoms), and they are then transplanted easily.

William D. Philbrick thought that the reason why melons are not as much grown as formerly, and do not pay as well, is the appearance of lice.

Hon. Marshall P. Wilder said that the melon crop is one that he always takes pains to secure, for he likes those of his own growth best. He had grown them on the same land for ten years. It has a south aspect. He prefers old manure, which he prepares a month or two beforehand. He makes a compost of old manure and soil, in layers a foot deep, adding some guano, and covering the whole with soil. This lies until it is in a fervent heat, when it is thrown over once or twice, and spread on the land, besides putting it in the hills. As melons root from every joint, surface manuring is very necessary. He plants the seed in hills under glass, in a bed or on sods. He has no trouble with insects; he gets up in the morning before they do, and scatters plaster of Paris around. He has grown a great many kinds—nearly all in cultivation. The Christiana can be grown by any one who can grow melons at all.

The White Japan is the earliest and most delicate. The Casaba is vigorous and reliable; he has a yellow-fleshed variety of it. The Bay View resembles it strongly.

Albert H. Smiley, of Poughkeepsie, N. Y., said that he prepares boxes six inches deep and a foot square, covered with netting, to forward his melons and keep off insects, and they work admirably. The temperature within them is between that of the open air and that under glass. Not a hill failed out of four acres thus treated, and they came forward early. He uses spent hops from the breweries as a fertilizer.

John B. Moore said that he grows greenflesh melons mostly. What Mr. Rawson says about not allowing the water to settle around the hills is very important. A long, cold storm will check melons if it does not ruin them. A neighbor of his grows melons very successfully without starting them in a hot-bed; he uses a small frame over each hill, with a pane of glass in a groove, so that it can be drawn out to ventilate, and thus they receive no check, either by transplanting or from the weather. He manures with barn-yard manure. Mr. Rawson uses a thousand cords on thirty-five acres, which is at the rate of over twenty-eight and a half cords per acre, and it is not to be expected that a few hundred pounds of fertilizer added to this would have any perceptible effect. Partially decomposed horse manure is superior to any other for market gardeners, for they cultivate the same ground year after year, and get no fertilizing matter from decaying grass, as when hoed crops alternate with grass, but this is supplied by the stable manure. I. P. Dickinson, of Springfield, has been very successful in growing melons, having shown the largest watermelons ever exhibited before this Society, and taken most of the prizes for several years past. He takes sandy ground in sward, and spreads manure on a strip three or four feet wide, and then turns two furrows on each side and plants the melons there, but does not plough the rest. Melons want a good deal of heat, and they get some from the slight fermentation of the sods and manure. A month or two later he ploughs wider. Mr. Moore said that boxes take a good deal of room for storing, but he thought he could get melons earliest by using them. He uses potash for melons, in addition to barn-yard manure, which he ascertained the advantage of on his soil by experiment, as every one must do for himself, for no chemist can do it for him.

Aaron D. Capen said that when he was in the business of growing vegetables for market, he planted squashes and melons in drills, sowing the seed as he did peas, thereby giving a supply for the bugs and a sufficient number of plants for a crop. The difficulty is to thin out sufficiently. The plants should be two or three feet apart. If he were to plant forty acres of squashes, cucumbers, or melons, he would put the whole in drills. By so doing, he can plough the first time within a few inches of the plants, and leave the ground in better condition than it was possible to do if the plants were in hills. He knew the Casaba melon when a boy. The flesh is delicious. He lost sight of it until a few years ago. Last spring he planted two patches on ground heavily manured in the fall, adding home-made guano in the drills, and secured the best crop he ever saw. By covering the later ones over with rhubarb leaves, he had them regularly on his breakfast table till the 20th of November.

Hon. James J. H. Gregory said that he had raised melons for many years, planting at first on sod, but now in pots. The sod is sometimes so tough that the plants appear to get root-bound and do not start well after transplanting. He liked the idea of planting in drills; he had planted his corn in drills for the last twenty years, and thought it the way of progress. He emphasized the importance of keeping the soil light; he would rather knock the vines about a little than not do it. Most of the soils here are not melon soils, and require to be thrown up and made light. Mr. Dickinson's soil, at Springfield, where he grows the fine melons to which reference has been made, is light and drains readily. The old-fashioned plan for squashes and melons was to quarry out a hill, and down in the cold hole dump a lot of manure. The modern and better plan is to keep the plant food very near to the surface, for melons and squashes want surface heat; their roots run near the surface, and he strews guano on the ground just ahead of the vines, for them to feed on. Most melons are picked before they are ripe, when there is no taste to them; they are rarely found in the market separated from the stem, which is the sign of ripeness in melons. Mr. Gregory asked, Why not bring fine ripe melons to market? He thought that if the White Japan, Christiana, and other fine-flavored kinds were offered, they would sell for as high or a higher price than the larger and coarser varieties. They might

be introduced by advertising and presenting specimens, as he did in introducing the Hubbard squash.

We want to adapt our soils to our vegetables and our vegetables to our soils. Reclaimed meadows are apt to produce spongy vegetables, unless a silicious soil is added. In Goshen, Orange county, N. Y., a reclaimed meadow of five hundred and sixty acres was planted to onions, and, with the addition of gravel containing silica, produced capital crops. Mr. Rawson's land gets enough manure without chemical fertilizers, but the speaker had succeeded well with them. He grew twenty acres of onions with chemical fertilizers, and cabbages with guano and phosphates. Each man must find out for himself what his ground needs. Our old pastures are especially deficient in phosphoric acid.

Mr. Wilder said that dropping chemical fertilizers would be poverty and death. There were between two and three million dollars' worth sold in Massachusetts last year. You can tell about how much corn a given quantity of fertilizer will produce, and we have got to come to the use of them.

Mr. Wetherell thought that Mr. Gregory was correct with regard to one point, the too early picking of melons. We want to move in the direction of maturing for market. Melons should be grown to perfection, and allowed to reach maturity.

Mr. Philbrick said that melons perfectly ripened on the vines are undoubtedly better than if picked earlier, but it is almost impossible to market them, without their melting away. Cultivators near a market have a great advantage in the ability to place melons before consumers in the best condition.

Mr. Gregory said that he had been trying to get some one to join with him to collect facts in regard to large and interesting trees in New England, and secure photographs of them. He alluded to the many fine elms in New England, and said that not one is to be found in California. The finest one he had seen is at Weathersfield, Conn.

On motion of Mr. Wetherell, Mr. Gregory was added to the Committee on Old and Interesting Trees.

William C. Strong exhibited a fasciated branch of the Baroness Rothschild rose, so broad, flat, and prickly as to be mistaken for a branch of a cactus.

The President announced that next Saturday the subject would

be, "What is the best method of repelling or destroying the Insect Enemies of fruit and fruit trees, especially the Codling Moth? Is trapping a proved success? What are the results of experiments with Paris green or any other poisonous application?" To be opened by Jacob W. Manning.

REPORT

OF THE

COMMITTEE ON PLANTS AND FLOWERS,

FOR THE YEAR 1882.

BY WILLIAM H. SPOONER, CHAIRMAN.

Another year of successive seasons of varied leaf and bloom having passed, its close brings your Committee to the consideration of the varied features which have been presented to us during its passage.

We are not able to report so large an exhibit through the season as in some former years, no doubt owing to the extremely dry weather during the summer months; we shall first notice the

AZALEA AND ROSE SHOW.

MARCH 23.

The exhibit of Azaleas was not large, but some exceptionally fine plants were shown; Edward Butler, gardener to Mrs. Pauline Durant, Marshall P. Wilder, and President Francis B. Hayes were the contributors, with choice plants, the last especially presenting a group of new varieties, viz.:

Crystalline,
Kaiserin Augusta,
Louis Lubbers,
Madame Ambrose,
Remembrance of Lady Florence Hastings,
W. Wilson Saunders.

HYBRID PERPETUAL ROSES in pots were shown by Francis B. Hayes and W. J. Vass; also excellent cut blooms from W. J.

Vass and John B. Moore & Son. We should be glad to see this department more fully represented; the commercial value of roses at this season is probably the strongest reason for the small number of contributors.

Greenhouse Plants were exhibited by John L. Gardner and Edwin Fewkes; fine Orchids by F. L. Ames; Hardy Shrubs and Heath by John L. Gardner and F. B. Hayes; Cyclamens in large quantities by C. B. Gardiner, but not as large plants as he presented several years ago. Primulas, single and double, were represented by well-grown plants; the former from J. L. Gardner, and the latter from Hovey & Co.; Cinerarias from John E. Peabody and William Patterson; Hyacinths, Narcissus, and Jonquils from John L. Gardner; Camellias from Hovey & Co. Of Cut Flowers, a good display for the season came from Hovey & Co. and Mrs. A. D. Wood; also bouquets from James O'Brien. From Henry R. Comley came Seedling Pink No. 1; color white, strong grower, dwarf, very double large flowers, about two inches in diameter, with fringed edges; a profuse bloomer, raised in 1881.

PELARGONIUM EXHIBITION.

May 15.

These shows gradually decrease from year to year, the only contributor of pelargoniums on this occasion being Hovey & Co. An excellent display of Calceolarias was made by John L. Gardner, who also contributed Tulips.

RHODODENDRON SHOW.

June 10.

The season was not propitious for this exhibition, the severe frost in the early autumn of 1881 injuring many plants seriously. President Francis B. Hayes and John L. Gardner were the competitors for the prizes, Mr. Hunnewell exhibiting as usual for the general display. The display of Hardy Azaleas was the smallest for many years.

Tree Pæonies were shown in good flowers by Marshall P. Wilder, and Hovey & Co. The display of Cut Flowers was very

good, by W. K. Wood, Mrs. E. M. Gill, and Mrs. L. P. Weston; Hardy Flowering Shrubs by George Craft, and Hovey & Co., and Native Plants by E. H. Hitchings. Woolson & Co., of Passaic, N. J., presented another fine collection of Hardy Herbaceous Plants, being the second large exhibit made by them of this beautiful and deservedly popular class of plants.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 30.

Progress in this department of horticulture is what we now have a right to expect, considering the great improvement made by the English and French hybridizers in the quality, variety, and perpetual blooming character of Hardy Roses. Their cultivation in this country has increased with surprising rapidity, and our own Society can justly claim a large share of the credit. The exhibition this year was grand in the quality of the flowers, though the quantity was not as large as that of last season. For the fourth time, we received the privilege of conferring prizes of silver vases, which were competed for with some of the finest flowers we have ever seen in the Hall, and we are glad to report an increased number of contributors.

SPECIAL PRIZES FOR HYBRID PERPETUAL ROSES.

A Silver Vase, value $75, for the best twenty-four roses of different kinds, named, was awarded to William Gray, Jr., for:

Alfred Colomb,
Boïeldieu,
Caroline de Sansal,
Comtesse d'Oxford,
Duc de Morny,
Duchesse de Vallombrosa,
Duke of Edinburgh,
Louis Van Houtte,
Mabel Morrison,
Magna Charta,
Marguérite Brassac,
Marguérite de St. Amand,
Marie Baumann,
Marquise de Castellane,
Mme. Clémence Joigneaux,
Mme. Gabriel Luizet,
Mme. L. Paillet,
Mme. Victor Verdier,
Mons. Boncenne,
Mons. E. Y. Teas,
Mrs. Baker,
Penelope Mayo,
Prince Camille de Rohan,
Senateur Vaïsse.

A Silver Vase, value $15, for the best three roses, of different varieties, named, to Francis B. Hayes, for Baron de Bonstetten, Duchesse de Vallombrosa, and Souvenir de Louis Van Houtte.

A Silver Vase, value $30, for the best six roses, of different varieties, named, to J. S. Richards, for

Charles Lefebvre,	Mme. Nachury,
François Michelon,	Paul Neron,
Marie Baumann,	Princess Mary of Cambridge.

A Silver Vase, value $40, for the best twelve roses, of different varieties, named, to William H. Spooner, for

Alfred Colomb,	Mme. la Baronne de Rothschild,
Baron de Bonstetten,	Mons. Boncenne,
François Michelon,	Mons. E. Y. Teas,
Hippolyte Jamain,	Perfection de Lyon,
Louis Doré,	Pierre Notting,
M'lle Marguérite Dombrain,	Sir Garnet Wolseley.

A Silver Vase, value $15, for the best three roses of any one variety, to John L. Gardner, for Mme. la Baronne de Rothschild.

A Silver Vase, value $30, for the best six roses of any one variety, to William H. Spooner, for Jean Liabaud.

A Silver Vase, value $40, for the best twelve roses of any one variety, to William Gray, Jr., for Mme. la Baronne de Rothschild.

A Silver Challenge Vase, value $200, for the best twenty-four varieties, three specimens of each, to be held for three consecutive years, the first season offered, was awarded to John B. Moore & Son, for

Alfred Colomb,	Marguérite de St. Amand,
Barthélemy Joubert,	Marquise de Castellane,
Boïeldieu,	Maurice Bernardin,
Charles Lefebvre,	May Turner,
Emily Laxton,	M'lle. Marius Cote,
Fisher Holmes,	Mme. la Baronne de Rothschild,
Grand Duke Nicholas,	Mme. Gabriel Luizet,
Hippolyte Jamain,	Mme. Victor Verdier,
John Hopper,	Perfection de Lyon,
La Rosière,	Queen Eleanor,
Mabel Morrison,	Sir Garnet Wolseley,
Magna Charta,	Thomas Mills.

SOCIETY'S PRIZES.

For the best six new varieties of Hardy Perpetual Roses, sent out since 1877, the second prize was awarded to John B. Moore & Son.

For the best twenty-four named varieties, three of each, the first prize to John B. Moore & Son, for

Alfred Colomb,	Maréchal Vaillant,
Barthélemy Levet,	Marguérite de St. Amand,
Boïeldieu,	Marquise de Castellane,
Charles Lefebvre,	Maurice Bernardin,
Dr. Sewell,	Mme. Marius Cote,
Duke of Edinburgh,	Mme. Rivers,
Duke of Wellington,	Mme. Sophie Fropot,
Fisher Holmes,	Monsieur Boncenne,
John Hopper,	Paul Neron,
Jules Margottin,	Queen Eleanor,
La Rosière,	Senateur Vaïsse,
Mabel Morrison,	Sir Garnet Wolseley.

For the best twelve distinct named varieties to William Gray, Jr., for

Auguste Neumann,	Hippolyte Jamain,
Camille Bernardin,	Jules Margottin,
Charles Lefebvre,	M'lle. Bonnaire,
Duchesse de Caylus,	M'lle. Marie Cointet,
Étienne Levet,	M'lle. Marie Verdier,
Exposition de Brie,	Star of Waltham.

For the best six varieties to William Gray, Jr., for

Baron de Bonstetten,	Horace Vernet,
Beauty of Waltham,	Mme. Gabriel Luizet,
Édouard Morren,	Mons. Boncenne.

For the best three varieties to Francis B. Hayes.

MOSS ROSES.—For the best six and best three named varieties, the prizes were both awarded to John B. Moore & Son.

TEA, OR BOURBON ROSES.—The prize for twelve cut blooms went to Edwin Fewkes, for very fine specimens.

The general display of all classes, chiefly Hybrid Perpetual varieties, was the largest and finest of the kind that has ever been

made. J. S. Richards, F. B. Hayes, W. H. Spooner, B. G. Smith and James Nugent were the contributors.

Jackson Dawson, of the Arnold Arboretum, exhibited an interesting collection of eighteen species of roses of different countries.

It may not be out of place to record some personal observations in regard to the date of blooming of many varieties of Roses, particularly in the late summer and autumn months.

August 1, we noticed the following varieties in full bloom:

Alice Dureau,
Antoine Mouton,
Baronne de Maynard,
Bertha Baron,
Boïeldieu,
Comtesse de Serenye,
Duchesse de Morny,
Elie Morel,
Elizabeth Vigneron,
John Hopper,
La France,
Louis Doré,
M'lle. Bonnaire,
M'lle. Marie Finger,
Mme. François Pittet,
Princess Beatrice,
Souvenir d'Arthur Sansal.

August 23 and 27, we noticed most of the above varieties in flower. Our Elizabeth Vigneron was planted in April, 1882, and is a remarkably vigorous grower and a free autumn bloomer.

September 27, many of the same varieties were in bloom.

October 20, Louis Doré was very fully in bloom; this rose makes a short-jointed, bushy growth, and the flower stem is very short, which is its objectionable feature. The following were also fully in bloom:

Antoine Mouton,
Comtesse de Serenye (a very free grower),
Duchesse de Morny,
Elizabeth Vigneron,
Jules Margottin,
Victor Verdier.

Climbing Bessie Johnson, planted May, 1882, was in full bud. We also noticed a few Alfred Colomb, Dupuy Jamain, Mme. la Baronne de Rothschild, and Marie Baumann. Salet, James Veitch, and Mrs. William Paul (Perpetual Mosses) had a few buds.

ANNUAL EXHIBITION,

SEPTEMBER 19, 20, 21, AND 22.

This exhibition was not as extensive as it has sometimes been, but the collections of plants shown were exceptionally fine. Those of Mr. Hunnewell were not as large specimens as he has shown in former years, but were remarkably choice in quality and variety, and were grouped with rare effect. S. R. Payson was a large contributor, with excellent plants, and Hovey & Co. also presented a large collection, the whole forming a display of rare beauty, and an opportunity for comparison seldom seen in our Halls. The wisdom of adding more prizes to the list of Greenhouse Plants was shown in these grand exhibits.

Mr. Hunnewell was first, with

Alocasia metallica,
Alocasia Thibautiana,
Anthurium crystallinum,
Croton nobilis,
Cyanophyllum magnificum,
Dracæna magnifica,
Ficus Parcelli,
Maranta pardina,
Maranta virginalis,
Musa vittata,
Phyllotœnium Lindeni,
Sphærogyne latifolia.

S. R. Payson was second, with

Adiantum cuneatum,
Adiantum Farleyense,
Alocasia metallica,
Alocasia Thibautiana,
Cissus discolor,
Croton variegatum,
Dieffenbachia Bausei,
Dracæna Robinsoniana,
Encephalartos villosus,
Maranta Veitchii,
Pandanus Veitchii,
Phyllotœnium Lindeni.

Hovey & Co. were third, with

Araucaria Bidwillii,
Corypha australis,
Dasylirion glaucum,
Dasylirion longifolium,
Dion edule,
Dracæna umbraculifera,
Ficus elastica,
Kentia Balmoreana,
Kentia Forsteriana,
Pandanus ornatus,
Phormium Veitchii var.,
Seaforthia elegans.

For SPECIMEN FLOWERING PLANTS, Francis B. Hayes took the first prize with *Bougainvillea glabra*, and the second with *Allamanda Schottii*.

VARIEGATED LEAVED PLANTS.—The first prize was awarded to H. H. Hunnewell, for

Alocasia macrorrhiza fol. var.,
Aralia monstrosa,
Croton Disraeli,
Croton Queen Victoria,
Dieffenbachia Bausei,
Maranta roseo-picta.

The second to Hovey & Co., for

Alocasia variegata,
Ananassa variegata,
Caladium argyrites,
Campylobotrys Ghiesbreghtii,
Dieffenbachia Bausei,
Eurya latifolia var.

CALADIUMS.—Hovey & Co. were first, with the following six varieties:

Alfred Bleu,
Chantini,
Herold,
Meyerbeer,
Rossini,
Triomphe d' l'Exposition.

FERNS.—Hovey & Co. were awarded the prize for the following as the best six:

Asplenium Mariesii,
Athyrium Goringianum pictum,
Dicksonia antarctica,
Nephrolepis davalloides furcans,
Nephrolepis tuberosa,
Platycerium alcicorne majus.

ADIANTUMS.—Hovey & Co. took the prize for the best six, with

A. amabilis,
A. concinnum latum,
A. cuneatum,
A. decorum,
A. Farleyense,
A. gracillimum.

TREE FERNS.—The first prize was given to Hovey & Co., for *Alsophila australis*.

DRACÆNAS.—H. H. Hunnewell was awarded the first prize, for

D. amabilis,
D. Baptistii,
D. Mooreana,
D. Mrs. Hunnewell,
D. Shepherdii,
D. Youngi.

S. R. Payson took the second, with

D. amabilis,
D. Baptistii,
D. filifera,
D. Hendersonii,
D. Mooreana,
D. Youngi.

PALM, single specimen.—S. R. Payson was first with *Cocos Bonnetti*, and Hovey & Co. second, with *Pritchardia Pacifica*.

AGAVES.—Hovey & Co. were first, with

A. applanata,
A. filifera,
A. Gilbeyi,
A. hystrix,
A. Nissonii,
A. Victoria Regina.

OTHER SUCCULENTS, Hovey & Co., for

Aloe Arborea var.,
Aloe Hoveyii,
Aspera spiralis,
Dyckia remotiflora,
Echeveria agavoides,
Echeveria Hoveyi,
Echeveria undulata,
Euphorbia polygona,
Gasteria sulcata,
Haworthia attenuata,
Haworthia coarctata,
Rhipsalis pentaptera.

GLADIOLI were shown only by George Craft, and were not as good as he has shown in former years.

DAHLIAS were not exhibited in large numbers; the contributors were John L. Gardner, Francis B. Hayes, James Nugent, and Edwin Fewkes. In single varieties the prize was awarded to E. Sheppard.

CUT FLOWERS were remarkably fine, which was unexpected, the drought having seriously impaired the beauty of most out-door flowers. Hovey & Co., Mrs. E. M. Gill, and James Nugent were the contributors.

S. R. Payson exhibited the beautiful new plant, *Asparagus plumosus nanus*, in bloom; its remarkably delicate foliage and attractive white flowers will make it a very desirable plant for decorative purposes. From Joseph Tailby came also a small plant of the above. H. H. Hunnewell presented a fine plant of the same species; also a plant of *A. tenuissimus*, a later introduction than the above, and which may prove more desirable for commercial and decorative use.

CHRYSANTHEMUM SHOW.

NOVEMBER 9 AND 10.

Without doubt this exhibition eclipsed any of the kind ever made by the Society. The Upper Hall, in which it was held, was brilliant with the lovely flowers, the general effect being greatly

enhanced by the plan of arrangement, which was that of massing the plants in front of the windows and mirrors, on platforms rising terrace-like, giving full display to the blaze of bloom, in which the fringed blossoms of the Japanese varieties contrasted prettily with the more compact Chinese, or Large Flowered sorts. E. W. Wood, and H. P. Walcott were the contributors in the larger classes, with beautiful plants, well grown, and in the finest condition of bloom, all of superior merit. John L. Gardner also contributed very fine plants, and a few good varieties came from George Higginson. Norton Brothers and Marshall P. Wilder each presented large collections in smaller sized plants. The display of cut blooms was also very effective, with a larger number of contributors than ever before.

Dr. H. P. Walcott was first, with six large flowered varieties, as follows:

Boule de Neige,	Mr. Brunlees,
Felicity,	Orange A. Salter,
Fleur de Lilas,	Prince Alfred.

Dr. Walcott was first with six Japanese varieties:

Fanny Boucharlet,	La Charmeuse,
Grandiflora,	M. Delaux,
Juvena,	Parasol.

Also with four Pompones:

Mr. Astie,	Salomon.
Rosinante,	Zobeide,

Dr. Walcott was first and second in the display of Specimen Plants, Large Flowered, with Souvenir de Mercédès and Reine Blanche.

E. W. Wood was first in Specimen Plants, Japanese, with Golden Dragon. John L. Gardner was second, with Mme. Bertier.

Dr. Walcott was first in Specimen Plants, Pompone, with Golden M'lle. Marthe. E. W. Wood was second, with La Fiancée, and also first with a beautiful group of fine plants, viz:

Boule de Neige,	Cossack,
Bouquet Fait,	Dr. Sharpe,
Christine,	Fair Maid of Guernsey,
Citronella,	Golden Circle,

Golden Dragon,
Golden Queen,
Guernsey Nugget,
Madame Domage,
Mazeppa,
M'lle. de Moulise,
Mongolfier,
Montariol,
Mrs. George Rundle,
Prince of Wales,
Prince Victor,
Semiramis,
Solfaterre,
Temple of Solomon,
White Eve.

Dr. Walcott was first with twelve cut blooms, Large Flowered, and E. W. Wood first for six cut blooms, Large Flowered; also for twelve sprays, Pompones:

Amphilia,
Durnflet,
Gen. Canrobert,
Julie Lagravère,
La Fiancée,
Madame Domage,
Mazeppa,
Model of Perfection,
Mongolfier,
Peri,
Semiramis,
Solfaterre.

E. W. Wood was also first for six Japanese, with

Bouquet Fait,
Cossack,
Daimio,
Fair Maid of Guernsey,
Golden Dragon,
Magnum Bonum.

Dr. Walcott exhibited in his collection two seedlings, which he has named President Wilder and President Parkman. In our report of last year we referred to the success attained by Dr. Walcott in the growth of seedling chrysanthemums, and the strong probability of still more noticeable results in another year, which anticipation has been entirely fulfilled. Dr. Walcott has furnished a brief description of his experiments:

"Four years ago, I prepared a small house, heated by a flue, for the purpose of ripening seed; by keeping the air quite dry, and, in the case of the flowers with long, ligulate corollas, by cutting off the corolla down to the level of the stigma, I secured a small number of seeds. The next year I hybridized, and the next also, and think that upon the whole I have gained by it. President Parkman resembles Purple King, but is much larger, at least three weeks earlier, and thus far less subject to mildew. President Wilder has a slight resemblance to the old variety Lucien Barthère, but a cursory examination will show the differ-

ence; the backs of the rosy-red petals of President Wilder are bright yellow, the centre is more distinct and raised than in Lucien Barthère, and, lastly, while the petals of the latter are quilled quite to the tips, those of President Wilder are quite flat. The flower measures three inches across. President Parkman is three inches and three-quarters across, quite full, and shows no centre; in color, a very deep violet or purple."

In Dr. Walcott's collection there was also a new Pompone Chrysanthemum, Fanny, very dark; somewhat similar to Bob, but much better.

H. H. Hunnewell presented fine Orchids, and several very pretty varieties of Capsicum.

MISCELLANEOUS EXHIBITIONS.

February 18, E. M. Wood presented a bunch of the finest blooms of the Maréchal Niel rose that we have ever seen. April 15, from the same contributor came two plants of *Lilium longiflorum floribunda*, with seven or eight flowers to each. Also, from John L. Gardner, two plants of Miles's Hybrid Spiral Mignonette, with very large spikes of flowers; this variety is an abundant bloomer, and of delicate fragrance; the two plants were remarkably well grown.

February 25, we had from B. G. Smith, Seedling Carnation Wilkie Collins; large full flower, color deep crimson suffused with cardinal, with no indications of bursting; a free bloomer and strong grower.

April 15, Sewall Fisher presented a collection of Seedling Carnations, viz.: Cardinal, originated in 1878; color deep cardinal red shading to maroon at the outer edges of the petals, very rich color and finely perfumed; very free flower with some tendency to burst in the bud. Fascination, originated in 1877; large round flower, color pure white delicately blotched with rosy purple; very vigorous, and does not appear to burst. Chief, originated in 1878; very large pure white flower, delicately scented. Early White, a good sized flower; color pure white; a profuse bloomer in full clusters. Prince Waldeck, originated in 1881.

April 29, Hon. Marshall P. Wilder exhibited specimens of Seedling Azaleas, one year old, from hybridized seed; some of

them one foot high, with branches. Colonel Wilder says he expects to have them in bloom in two years from the seed. Also from the same, June 3, Seedling Azalea Mrs. Julia Wilder; flower large, double, imbricated, and of the most perfect form; color a delicate light rose or pink; plant vigorous, foliage strong; a late variety.

May 6, from John C. Hovey, *Narcissus bicolor* and the varieties Emperor and Empress. The two latter are much finer than the type.

President Francis B. Hayes has exhibited some very fine Ericas, viz.: *Erica tricolor exquisita*, *E. ventricosa magnifica*, and *E. tricolor Lindleyana*. Also, Azalea Roi des Roses; color deep rose, edges of petals marked white, base of upper divisions deep purple crimson. July 29, Mr. Hayes displayed the best collection of Stocks that have been seen for several years.

July 8th, H. H. Hunnewell presented specimens of *Lilium Wilsoni*, with large orange red flowers dotted with dark brown spots. The same day came from E. Sheppard, *Lilium Dalmaticum*, and *L. Pomponium*, orange red.

July 8 and 22, Jackson Dawson, of the Arnold Arboretum, exhibited a large collection of rare or desirable shrubs, as follows:

Amorpha canescens,
Calluna vulgaris, N. E. var.,
" " var. *carnea*,
Ceanothus Americanus,
Clematis Pitcheri,
" *vitalba*,
Cornus sericea,
Cytisus nigricans,
Diervilla sessilifolia,
Erica tetralix,
Erica vagans,
Hydrangea radiata,
Hypericum calycinum,
" *elegans*,
" *Kalmianum*,
" *multiflorum*,
" *officinale*,
" *patulum*,
Lespedeza bicolor,
Ligustrum coriaceum,
" *Japonicum*,
Lonicera Morrowii,
" " *var.*,
Potentilla fruticosa,
Psoralea stipulosa,
Ribes saxatile, var. *inerme*,
Robinia hispida,
Rosa setigera,
Rubus odoratus,
Spiræa ariæfolia,
" *Billardieri*,
" *callosa*,
" " var. *alba*,
" *carpinifolia*,
" *Douglasii*,
" *eximia*,
" *rosea*,

Spiræa salicifolia, var. *bella*,
" " var. *Lin-næana*,
" *salicifolia*, var. *Nobleana*,
" " var. *rosea*,
" " var. *semperflorens*,
Spiræa sorbifolia,
" *vacciniifolia*,
Sambucus ebulis,
Vaccinium corymbosum,
" *Pennsylvanicum*,
" *vacillans*.

July 15, from J. C. Hovey came *Opuntia Rafinesquiana robusta*: "This is a new and much improved seedling variety of our native Western Cactus. The plant forms a prostrate, spreading mass of flat, thick, dark green joints, with a very few spines. The flowers, which are produced in great numbers about the middle of July, are golden yellow with a red centre, and measure from four to five inches in diameter; it has proved perfectly hardy in all situations in this locality."

July 29, John B. Moore & Son made a fine exhibit of Perennial Phloxes, of which the following were the best six:

Baronne Hely V. Oisse,
Citoyen de Capreva,
Czarina,
Henry Linde,
Richard Wallace,
Mme. Froment.

August 5, from R. T. Jackson, came twenty-eight species and varieties of hardy native Ferns, all cut from plants under cultivation, most of which plants were collected in the vicinity of Boston.

August 12, from J. W. Clark, a Seedling Gladiolus; large, full spike of flowers; color of the three upper divisions light rose flaked purple, with a light stripe through the centre of each petal; lower divisions almost white, tipped and flaked with purple and shaded with lemon color.

August 12, E. H. Hitchings contributed

Aletris farinosa,
Asclepias tuberosa,
Calopogon pulchellus,
Cassia Chamæcrista,
Hypericum corymbosum,
Habenaria blephariglottis (White Fringed Orchis),
Habenaria ciliaris (Yellow Fringed Orchis),
Lilium superbum,
Polygala polygama,
Verbascum Blattaria,
Woodwardia angustifolia.

September 2, from John C. Hovey, a group of *Amaryllis Hallii*, which he considers perfectly hardy, as he has had it planted in the open ground seven or eight years. The flower is very much

in the way of *A. Belladonna*, or rather *A. Belladonna pallida*, though differing somewhat from both these varieties—much lighter pink than the first, and varying from the latter in having a bluish vein running through the centre of each petal, which is more lanceolate in form than either of these kinds; the color is a soft rose or light pink, with six or seven flowers on each stem. Mr. Hovey stated that this handsome Amaryllis was given him by Mr. I. D. Hall, of New Bedford, who was unacquainted with its name, but said it was given him by the captain of a vessel from East India. Dried flowers, with a description, were sent to Kew several years ago by Mr. Hovey, but without response; he therefore named the plant *Amaryllis Hallii* in honor of Mr. Hall, since deceased.

September 2, we had also from W. H. Spooner, Seedling Gladiolus, No. 101, from Diamond crossed with Marie Stuart and Richard Cœur de Leon, in color somewhat like Diamond, but each petal more distinctly blotched with purple.

At the Annual Exhibition, William C. Strong presented specimen foliage of the beautiful *Acer platanoides purpurea*.

Samuel Smith, of Newport, R. I., exhibited a very fine collection of Single Dahlias; Henry Ross, some remarkably large flowers of Calendula Meteor; Mrs. C. N. S. Horner, a large and choice selection of native flowers; and E. H. Hitchings, a rare collection of ten species of Solidago.

September 30, E. Sheppard exhibited a Single Dahlia, White Queen.

October 7, William A. Bock presented a good collection of seedling Pelargoniums, viz.:

Double varieties:

Gen. Hancock,	The Gem (bronze leaves),
Mrs. Mary E. Bock,	Tricolor.

Single varieties:

A. Lincoln,	Cambridge Beauty,
William A. Bock,	H. W. Longfellow.

On the same day came from Macy Randall several very pretty dwarf or bedding Dahlias, viz.:

Gem, spotted,	Rising Sun, magenta or garnet,
Princess Mathilde, white,	Sambo, nearly black.

November 18, George Cartwright presented a bloom of the new Tea Rose, Étoile de Lyon, very large and superb in form, vigorous in growth; color, fine lemon yellow.

Charles J. Power has at different times exhibited plants grown in the Dumesnil Fertilizing Moss, in fine condition of growth. The first collection, shown June 21, contained a carnation, heliotrope, lantana, verbena, and hibiscus, put into the moss April 4; a coleus, May 8; and a fuchsia, May 20. June 30, he presented another collection of fifteen plants; among them one of Canterbury bells, taken from the open ground, the roots washed out clean, and potted in moss June 19, and apparently doing well. Again, on July 8, he showed a strawberry plant, larkspur, and chrysanthemum, lifted from the open ground, the roots washed clean and put into moss July 6, with no indication of wilting. August 19, he exhibited the same collection shown June 21, in a most vigorous condition of growth. At the Annual Exhibition, another large lot of plants in excellent condition was shown. While we cannot recommend this system of culture for general use, we think it has merits for window gardening purposes, from its lightness, cleanliness, and freedom from worms, and greater ability to sustain life during lack of moisture from neglect.

The amount of money prizes and gratuities awarded is $1,392, out of the appropriation of $1,500.

Prizes have been awarded from the Hunnewell fund to the amount of $44.00.

All which is respectfully submitted.

WM. H. SPOONER,
JOS. H. WOODFORD,
CHAS. W. ROSS,
JAMES CARTWRIGHT,
PATRICK NORTON,
DAVID ALLAN,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

JANUARY 7.

Gratuity :—

Francis B. Hayes, Display of Flowers, ... $2 00

JANUARY 21.

Gratuity :—

Francis B. Hayes, Display of Flowers, ... 1 00

JANUARY 28.

Gratuities :—

Francis B. Hayes, Display of Flowers, ... 1 00
W. D. Forbes, *Poinsettia pulcherrima*, ... 1 00

FEBRUARY 4.

Gratuities :—

John E. Peabody, Collection of Plants, ... 10 00
Francis B. Hayes, Display of Flowers, ... 1 00
" " " *Rhododendron Veitchii*, ... 2 00
Mrs. A. D. Wood, *Freesia refracta*, ... 1 00

FEBRUARY 11.

Gratuity :—

Francis B. Hayes, Display of Flowers, ... 2 00

FEBRUARY 18.

Gratuities :—

Francis B. Hayes, Display of Flowers, ... 1 00
Hovey & Co., " " Camellias, ... 1 00

FEBRUARY 25.

Gratuities :—

Francis B. Hayes, Display of Flowers, ... 1 00
" " " Two Ericas, ... 2 00
Hovey & Co., Display of Camellias, ... 1 00

MARCH 4.

Gratuities :—

John L. Gardner, Standard Rose, in pot, ... 2 00
Henderson Inches, Hyacinths, ... 1 00
Hovey & Co., Camellias, ... 2 00
W. C. Strong & Co., Roses, ... 1 00

Francis B. Hayes, Display of Flowers,	$2 00
Mrs. A. D. Wood, " " "	2 00
Mrs. E. M. Gill, " " "	1 00

MARCH 11.

Gratuities:—

John E. Peabody, Collection of Plants,	6 00
John L. Gardner, Hyacinths,	3 00
Hovey & Co., Camellias,	2 00
John B. Moore & Son, Roses,	1 00
Francis B. Hayes, Display of Flowers,	2 00

MARCH 18.

Gratuity:—

Hovey & Co., Display of Flowers,	1 00

AZALEA AND ROSE SHOW.

MARCH 23.

INDIAN AZALEAS.—Six named varieties, in pots, Edward Butler, gardener to Mrs. Pauline Durant,	$12 00
Two named varieties, Marshall P. Wilder,	8 00
Specimen plant, Edward Butler, gardener to Mrs. Pauline Durant,	5 00
Four named varieties, in not exceeding ten-inch pots, Marshall P. Wilder,	8 00
Single plant, in not exceeding a six-inch pot, John L. Gardner,	4 00
Second, Francis B. Hayes,	3 00
HYBRID PERPETUAL ROSES.—Six plants, in not exceeding ten-inch pots, Francis B. Hayes,	10 00
Three plants, in not over eight-inch pots, William J. Vass,	6 00
Single plant, the second prize to William J. Vass,	3 00
Twelve cut blooms, not less than six distinct named varieties, Wm. J. Vass,	6 00
Second, John B. Moore & Son,	4 00
Single bloom, John B. Moore & Son,	1 00
TENDER ROSES.—Display, in dish, basket, or vase, not including Maréchal Niel, William J. Vass,	5 00
GREENHOUSE PLANTS.—Specimen in bloom, other than Azalea or Orchid, John L. Gardner,	5 00
Second, Edwin Fewkes,	4 00
ORCHIDS.—Three plants in bloom, F. L. Ames,	10 00
Second, F. L. Ames,	6 00
Single plant in bloom, F. L. Ames,	3 00
Second, Hovey & Co.,	2 00
HARDY FLOWERING SHRUBS, FORCED.—Three, in pots, of three distinct varieties, John L. Gardner,	4 00

Cyclamens.—Six plants, in not over eight-inch pots, in bloom, C. B. Gardiner,	$4 00
Three plants in bloom, C. B. Gardiner,	2 00
Second, C. B. Gardiner,	1 00
Single plant, in bloom, C. B. Gardiner,	2 00
Heath.—Single plant, in bloom, John L. Gardner,	3 00
Second, Francis B. Hayes,	2 00
Primulas.—Three plants, single flowered, in bloom, John L. Gardner,	2 00
Three plants, double flowered, in bloom, Hovey & Co.,	2 00
Cinerarias.—Four varieties, in not over nine-inch pots, in bloom, John E. Peabody,	4 00
Second, John E. Peabody,	3 00
Single plant, in bloom, William Patterson,	2 00
Second, John E. Peabody,	1 00
Hyacinths.—Twelve bulbs, in pots, not less than six varieties, in bloom, John L. Gardner,	5 00
Six bulbs, in pots, three varieties, in bloom, John L. Gardner,	4 00
Single bulb, in pot, in bloom, John L. Gardner,	1 00
Narcissus.—Four six-inch pots, two bulbs in each, in bloom, John L. Gardner,	3 00
Jonquils.—Four six-inch pots, six bulbs in each, in bloom, John L. Gardner,	3 00
Amaryllis —Three plants, the second prize to Mrs. E. M. Gill,	3 00
Camellias.—Display of named varieties, cut flowers with foliage, not less than twelve blooms, Hovey & Co.,	4 00
Second, Hovey & Co.,	3 00
Six cut flowers, with foliage, Hovey & Co.,	3 00
Cut Flowers.—Display, filling fifty bottles, not including Roses, Hovey & Co.,	3 00
Second, Mrs. A. D. Wood,	2 00
Hand Bouquets.—Pair, James O'Brien,	3 00

Gratuities:—

Edwin Fewkes, *Iris Pavonia* and Amaryllis Prince of Orange,	1 00
L. H. Foster, *Wistaria Sinensis*,	1 00
Benjamin G. Smith, Carnations,	1 00
Mrs. E. M. Gill, Tea Roses,	1 00
William J. Vass, Display of Flowers,	2 00
Francis B. Hayes, Collection of Plants and Flowers,	5 00
John L. Gardner, Collection of Plants,	4 00
C. B. Gardiner, Cyclamens,	2 00
E. L. Beard, Six pots Lily of the Valley,	2 00
Hovey & Co., Plants,	1 00
A. McLaren, Azalea Donna Maria, ,	1 00

MARCH 25.

Gratuities :—

Francis B. Hayes, Display of Flowers,	$2 00
Mrs. A. D. Wood, " " "	1 00

APRIL 1.

Gratuities :—

John B. Moore & Son, Collection of Roses,	1 00
Francis B. Hayes, " " "	1 00
Mrs. E. M. Gill, Amaryllis,	1 00
Mrs. A. D. Wood, Display of Flowers,	1 00

APRIL 8.

Gratuity :—

Francis B. Hayes, Collection of Ericas,	3 00

APRIL 15.

Gratuity :—

Mrs. A. D. Wood, Display of Flowers,	1 00

APRIL 29.

Gratuity :—

Mr. A. D. Wood, Display of Flowers,	1 00

PELARGONIUM SHOW.

MAY 13.

PELARGONIUMS.—Four named Variegated Zonale varieties, Hovey & Co.,	$5 00
Single plant, of any named Bronze variety, Hovey & Co.,	3 00
Four named Double Zonales, Hovey & Co.,	5 00
Six named Show or Fancy varieties, Hovey & Co.,	6 00
GLOXINIA.—Single specimen, S. E. Eames,	1 00
CALCEOLARIAS.—Six varieties, in pots, John L. Gardner,	5 00
Single plant, John L. Gardner,	1 00
TULIPS, twenty-five blooms, named varieties, John L. Gardner,	3 00
Second, John L. Gardner,	2 00
TABLE DESIGN, other than a basket of Flowers, Mrs. E. M. Gill,	3 00

Gratuities :—

E. Sheppard, Pelargoniums,	3 00
William A. Bock, "	1 00
John L. Gardner, Collection of Plants,	3 00
Edwin Fewkes, Display of Roses,	3 00
" " " Petunias,	1 00
William A. Bock, Pansies,	1 00
Benjamin G. Smith, "	1 00
Mrs. H. C. Meriam, "	1 00

Miss E. M. Harris, Display of Flowers,	$1 00
Mrs. E. M. Gill, " " "	1 00
Mrs. A. D. Wood, " " "	1 00
Mrs. L. P. Weston, " " "	1 00

JUNE 8.

Gratuities:—

John C. Hovey, *Sempervivum tomentosum*,	1 00
Marshall P. Wilder, Tydæa Belzebuth,	1 00
E. H. Hitchings, *Orchis spectabilis*,	1 00
Mrs. E. M. Gill, Display of Flowers,	1 00
Mrs. E. S. Joyce, " " "	1 00

RHODODENDRON SHOW.

JUNE 10.

Hunnewell Premiums.

HARDY AZALEAS.—Six named varieties, one truss each, Hovey & Co.	$4 00
Second, Benjamin G. Smith,	3 00
Cluster of trusses of one variety, Benjamin G. Smith,	2 00
Second, Benjamin G. Smith,	1 00

Society's Premiums.

TREE PÆONIES.—Six named varieties, Marshall P. Wilder,	3 00
Second, Hovey & Co.,	2 00
CUT FLOWERS.—Display, filling 100 bottles, W. K. Wood,	4 00
Second, Mrs. E. M. Gill,	3 00
Third, Mrs. L. P. Weston,	2 00
HARDY FLOWERING SHRUBS.—Twelve named varieties, cut blooms, George Craft,	3 00
Second, Hovey & Co.,	2 00
NATIVE PLANTS.—Display of named species and varieties, E. H. Hitchings,	4 00

Gratuities:—

H. H. Hunnewell, Collection of Azaleas and Rhododendrons,	10 00
Hovey & Co., Indian Azalea Plants,	3 00
Woolson & Co., Passaic, N. J., Display of Herbaceous Plants,	5 00
Marshall P. Wilder, Collection of Pæonies,	2 00
" " " *Amaryllis Hassami*,	1 00
Miss A. C. Kenrick, *Magnolia Lenne* and Lily of the Valley,	2 00
Hovey & Co., Display of Flowers,	5 00
George Craft, " " "	1 00
Miss S. W. Story, " " "	1 00

JUNE 21.

Hunnewell Premiums.

RHODODENDRONS.—Twenty-four Tender named varieties, Francis B. Hayes, ... $10 00
Second, Francis B. Hayes, ... 6 00
Single truss of any Tender named variety, Francis B. Hayes, . 1 00
Eighteen Hardy named varieties, John L. Gardner, . . . 10 00
Second, Francis B. Hayes, ... 6 00
Single truss of any Hardy named variety, Francis B. Hayes, . 1 00

Gratuities:—

E. Sheppard, Rhododendrons and Azaleas, ... 1 00
" " Clematis, ... 1 00
James Cartwright, *Cattleya Mossiæ*, ... 2 00
Hovey & Co., Display of Flowers, ... 2 00
George Craft, " " " 1 00
Mrs. E. M. Gill, " " " 1 00
Miss S. W. Story, " " " 1 00
B. G. Smith, " " " 1 00
E. H. Hitchings, Native Flowers, ... 1 00

JUNE 24.

Gratuities:—

John C. Hovey, Pyrethrums, ... 1 00
James Cartwright, *Dendrobium thyrsiflorum*, ... 2 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 30.

Special Prizes.

HYBRID PERPETUAL ROSES.—Twenty-four of different kinds, named, William Gray, Jr., Silver Vase, value, ... $75 00
Three Roses of different varieties, named, Francis B. Hayes, Silver Vase, value, ... 15 00
Six Roses of different varieties, named, John S. Richards, Silver Vase, value, ... 30 00
Twelve Roses of different varieties, named, William H. Spooner, Silver Vase, value, ... 40 00
Three Roses of any one variety, John L. Gardner, Silver Vase, value, ... 15 00
Six Roses of any one variety, William H. Spooner, Silver Vase, value, ... 30 00
Twelve Roses of any one variety, William Gray, Jr., Silver Vase, value, ... 40 00
Twenty-four varieties, three specimens of each, John B. Moore & Son, Silver Challenge Cup, to be held for three consecutive years, value, ... 200 00

Society's Prizes.

HARDY PERPETUAL ROSES.—Six new varieties, sent out since 1877, the second prize to John B. Moore & Son,	$4 00
Twenty-four distinct named varieties, three of each, John B. Moore & Son,	20 00
Twelve distinct named varieties, William Gray, Jr.,	10 00
Second, John B. Moore & Son,	8 00
Third, John S. Richards,	6 00
Six distinct named varieties, William Gray, Jr.,	6 00
Second, John L. Gardner,	5 00
Third, Francis B. Hayes,	4 00
Three distinct named varieties, Francis B. Hayes,	4 00
Second, John S. Richards,	3 00
Third, William H. Spooner,	2 00
MOSS ROSES.—Six named varieties, three clusters of each, John B. Moore & Son,	5 00
Second, Edward Haskell,	3 00
Three named varieties, three clusters of each, John B. Moore & Son,	3 00
TEA, OR BOURBON ROSES.—Twelve cut blooms, Edwin Fewkes,	3 00
GENERAL DISPLAY of one hundred bottles of all classes, John S. Richards,	7 00
Second, Francis B. Hayes,	6 00
Third, William H. Spooner,	5 00
Fourth, Benjamin G. Smith,	4 00
Fifth, James Nugent,	3 00
STOVE AND GREENHOUSE FLOWERING PLANTS.—Six distinct varieties, in bloom, John L. Gardner,	8 00
Second, Hovey & Co.,	6 00
SPECIMEN PLANT.—Regard being had to new or rare varieties, John L. Gardner,	4 00
Second, F. L. Ames,	2 00
SPECIMEN FOLIAGE PLANT.—The second prize to Hovey & Co.,	2 00
ORCHIDS.—Collection of not less than three varieties in bloom, F. L. Ames,	6 00
Single plant, F. L. Ames,	3 00
Second, Hovey & Co.,	2 00
HERBACEOUS PÆONIES.—Ten named varieties, Hovey & Co.,	3 00
SWEET WILLIAMS.—Thirty trusses, not less than six distinct varieties, E. Sheppard,	3 00
Second, Hovey & Co.,	2 00
Third, Mrs. E. M. Gill,	1 00
VASE OF FLOWERS.—Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill,	4 00

Gratuities:—

O. B. Hadwen, Collection of Roses,	1 00
Warren Heustis, " " "	1 00

Joseph H. Woodford, Clematis,	$2 00
Henry R. Comley, Carnations,	1 00
A. H. Fewkes, Hybrid Aquilegias,	1 00
John C. Hovey, Pæonies and Pyrethrums,	1 00
Miss A. C. Kenrick, Basket of Flowers,	1 00
William S. Ewell, Display of Flowers,	2 00
Mrs. E. M. Gill, " " "	1 00
Francis B. Hayes, " " "	1 00
Miss S. W. Story, " " "	1 00
Miss E. M. Harris, " " "	1 00
Mrs. L. P. Weston, " " "	1 00
E. Sheppard, " " "	1 00
Hovey & Co., " " "	1 00
E. H. Hitchings, Native Flowers,	1 00

JULY 8.

HYBRID PERPETUAL ROSES.—Twenty-five blooms, John B. Moore & Son,	5 00
Second, John L. Gardner,	4 00
DELPHINIUMS.—Six named varieties, Benjamin G. Smith,	3 00
Second, E. Sheppard,	2 00
CARNATIONS AND PICOTEES.—Twelve cut blooms, distinct kinds, Sewall Fisher,	2 00
Second, Benjamin G. Smith,	1 00
CUT FLOWERS.—Display filling one hundred bottles, Mrs. L. P. Weston,	4 00
Second, W. K. Wood,	3 00
Third, Miss E. M. Gill,	2 00

Gratuities:—

John B. Moore & Son, Hybrid Perpetual Roses,	2 00
B. G. Smith, Delphiniums,	1 00
E. Sheppard, "	1 00
Jackson Dawson, Hardy Shrubs,	2 00
Miss S. W. Story, Display of Flowers,	1 00
James Nugent, " " "	1 00
J. W. Manning, " " "	1 00
R. T. Jackson, Native Plants,	1 00

JULY 15.

LILIUM CANDIDUM.—Twelve spikes, John L. Gardner,	3 00
Second, Mrs. L. P. Weston,	3 00
VASE OF FLOWERS.—Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill,	3 00
Second, Mrs. A. D. Wood,	2 00

Gratuities:—

Francis Parkmann, *Iris Kæmpferi*, varieties,	$2 00
Miss E. M. Harris, *Lilium candidum*,	1 00
Miss S. W. Story, Display of Flowers.	1 00
Mrs. E. M. Gill, " " "	1 00
Mrs. L. P. Weston, " " "	1 00
J. W. Manning, " " "	1 00
Hovey & Co., " " "	1 00
Mrs. A. J. Dolbear, Native Plants,	1 00

JULY 22.

HOLLYHOCKS.—Twelve blooms of twelve different colors, John B. Moore & Son,	4 00
Second, John L. Gardner,	3 00
Six blooms of six different colors, Miss E. M. Harris,	2 00
Second, James Nugent,	1 00
Three blooms of three different colors, Mrs. E. M. Gill,	1 00
Single spike, Miss E. M. Harris,	2 00
Second, Miss E. M. Harris,	1 00
CUT FLOWERS.—Display filling one hundred bottles, Mrs. L. P. Weston,	4 00
Second, Mrs. E. M. Gill,	3 00
Third, W. K. Wood,	2 00

Gratuities:—

J. W. Manning, Herbaceous Plants,	1 00
Jackson Dawson, Collection of Hardy Shrubs,	2 00
Edwin Fewkes, Salpiglossis, in variety,	1 00
John L. Gardner, *Erica Parmentieriana rosea*,	2 00
Mrs. E. S. Joyce, Display of Flowers,	1 00
George Craft, " " "	1 00
Miss S. W. Story, " " "	1 00

JULY 29.

PERENNIAL PHLOXES.—Six distinct named kinds, one spike each, John B. Moore & Son,	3 00
Second, John B. Moore & Son,	2 00
LILIUM LONGIFLORUM.—Twelve spikes, E. Sheppard,	3 00
Second, Mrs. Bruce,	2 00
PELARGONIUMS.—Twelve double and single varieties, one truss each, Hovey & Co.,	2 00
Second, Hovey & Co.,	1 00
EXOTIC FERNS.—Six plants, of different varieties, in pots, Hovey & Co.,	5 00

Gratuities:—

E. Sheppard, Hollyhocks and Phloxes,	2 00
John B. Moore & Son, " " "	1 00

J. W. Manning, Lilies and Phloxes,	$1 00
Francis B. Hayes, Display of Flowers,	2 00
Mrs. E. M. Gill, " " "	2 00
Mrs. L. P. Weston, " " "	2 00
Miss S. W. Story, " " "	1 00

AUGUST 5.

HYBRID PERPETUAL ROSES.—Twenty-five blooms, Francis B. Hayes,	4 00
Second, John L. Gardner,	3 00
STOCKS.—Six varieties, one cut plant of each, Francis B. Hayes,	2 00
Second, Francis B. Hayes,	1 00
NATIVE FERNS.—Best display, Mrs. A. J. Dolbear,	3 00
CUT FLOWERS.—Display filling one hundred bottles, Mrs. L. P. Weston,	4 00
Second, Mrs. E. M. Gill,	3 00
COLLECTION of not less than twenty-five named species of Herbaceous Perennials, Hovey & Co.,	3 00
VASE OF FLOWERS.—Best arranged, in one of the Society's glass vases, Francis B. Hayes,	2 00

Gratuities:—

John L. Gardner, *Cattleya crispa*,	2 00
Henry R. Comley, Double Jacobeas,	1 00
J. W. Manning, Phloxes,	1 00

AUGUST 12.

PERENNIAL PHLOXES.—Ten distinct named varieties, one spike each, John B. Moore & Son,	3 00
Second, John B. Moore & Son,	2 00
PETUNIAS.—Collection filling thirty bottles, three blooms in each, Edwin Fewkes,	3 00
Second, Mrs. E. M. Gill,	2 00
Third, James Nugent,	1 00
VERBENAS.—Fifty bottles, three trusses in each, James Nugent,	3 00
Second, Henry R. Comley,	2 00
CUT FLOWERS.—Display filling one hundred bottles, W. K. Wood,	4 00
Second, Mrs. L. P. Weston,	3 00
Third, Mrs. E. M. Gill,	2 00
NATIVE FLOWERS.—Collection, Mrs. A. J. Dolbear,	3 00

Gratuities:—

Samuel Hartwell, Two Plants of Oleander,	2 00
James Cartwright, Gladioli,	1 00
Francis B. Hayes, Display of Flowers,	2 00

AUGUST 19.

GLADIOLI.—Ten named varieties, in spikes, Franklin Bacheller,	$4 00
Six named varieties, in spikes, O. B. Hadwen,	3 00
Single spike, named, D. Knox,	1 00
Display of named and unnamed varieties filling one hundred bottles, James Cartwright,	6 00
PHLOX DRUMMONDI.—Fifty bottles, not less than six varieties, Hovey & Co.,	3 00
Second, James Nugent,	2 00
Gratuities:—	
Edwin Fewkes, *Chrysanthemum carinatum*,	1 00
Francis B. Hayes, Display of Flowers,	2 00
Mrs. L. P. Weston, " " "	2 00
Mrs. E. M. Gill, " " "	2 00
Mrs. E. S. Joyce, " " "	1 00

AUGUST 26.

ASTERS.—Chrysanthemum, thirty blooms, not less than eight varieties, Francis Skinner, Jr.,	4 00
Second, Francis B. Hayes,	3 00
Third, James Nugent,	2 00
Pompon, thirty sprays, not less than six varieties, one spray in each bottle, Mrs. A. D. Wood,	3 00
BASKET OF FLOWERS.—Best arranged, Mrs. E. M. Gill,	3 00
Gratuities:—	
Francis B. Hayes, Hybrid Perpetual Roses,	2 00
Miss S. W. Story, *Lilium lancifolium*,	1 00
Henry R. Comley, Display of Asters,	2 00
James Nugent, " " Verbenas,	1 00
Mrs. L. P. Weston, " " Flowers,	2 00
Mrs. E. M. Gill, " " "	1 00

SEPTEMBER 2.

LILIUM LANCIFOLIUM.—Twelve spikes, Miss S. W. Story,	3 00
TROPÆOLUMS.—Display filling twenty-five bottles, Wm. H. Spooner,	3 00
Third prize to James Nugent,	1 00
MARIGOLDS.—Twenty-five bottles, three flowers in each, Francis B. Hayes,	3 00
Second, George Craft,	2 00
CUT FLOWERS.—Display filling one hundred bottles, Mrs. E. M. Gill,	4 00
Second, Mrs. L. P. Weston,	3 00
Gratuities:—	
John B. Moore & Son, Phloxes,	2 00
B. G. Smith, *Lilium lancifolium*,	1 00
Jos. H. Woodford, " *auratum*,	1 00

James Nugent, Asters and Verbenas, ... $1 00
George Craft, Gladioli, ... 2 00
E. Sheppard, Dahlias, ... 1 00
Miss E. M. Harris, Display of Flowers, ... 2 00

SEPTEMBER 9.

DOUBLE ZINNIAS.—Twenty-five flowers, not less than six varieties,
James Nugent, ... 3 00
Second, George Craft, ... 2 00
Third, William Patterson, ... 1 00

Gratuities:—

George Craft, Gladioli, ... 2 00
Hovey & Co., Plants, ... 2 00
E. Sheppard, *Dendrobium formosum*, ... 2 00
Eben Bacon, Tuberous-rooted Begonias, ... 1 00
Mrs. E. M. Gill, Display of Flowers, ... 2 00
Mrs. L. P. Weston, " " " 1 00
Mrs. E. S. Joyce, " " " 1 00
Miss S. W. Story, " " " 1 00
Mrs. A. J. Dolbear, Native Plants, ... 2 00

ANNUAL EXHIBITION.

SEPTEMBER 19, 20, 21, AND 22.

GREENHOUSE PLANTS.—Twelve Greenhouse and Stove Plants, of different varieties, one Dracæna and one Croton admissible,
H. H. Hunnewell, ... $30 00
Second, S. R. Payson, ... 25 00
Third, Hovey & Co., ... 20 00
SPECIMEN FLOWERING PLANT.—Francis B. Hayes, ... 5 00
Second, Francis B. Hayes, ... 4 00
VARIEGATED LEAVED PLANTS.—Six varieties, not offered in a collection of Greenhouse plants, Dracænas not admissible, H. H.
Hunnewell, ... 12 00
Second, Hovey & Co., ... 10 00
SPECIMEN PLANT, not offered in any collection, John L. Gardner, . 5 00
Second, Hovey & Co., ... 4 00
CALADIUMS.—Six varieties, Hovey & Co., ... 5 00
Second, E. Sheppard, ... 4 00
FERNS.—Six named varieties, no Adiantums admissible, Hovey &
Co., ... 6 00
ADIANTUMS.—Six varieties, Hovey & Co., ... 6 00
TREE FERN.—Single specimen, Hovey & Co., ... 6 00
DRACÆNAS.—Six named varieties, H. H. Hunnewell, . . . 8 00
Second, S. R. Payson, ... 6 00

PALM.—Single specimen, S. R. Payson,	$5 00
Second, Hovey & Co.,	4 00
AGAVES.—Six distinct kinds, Hovey & Co.,	6 00
SUCCULENTS.—Collection of twelve species, other than Agaves, Yuccas, or Cacti, Hovey & Co.,	5 00
BEGONIAS.—Tuberous-rooted, six named varieties, E. Sheppard,	5 00
Second, Hovey & Co.,	4 00
GLADIOLI.—Best display and best kept during the exhibition, of named or unnamed varieties, filling one hundred bottles, George Craft,	10 00
DAHLIAS.—Twelve named varieties, John L. Gardner,	5 00
Second, Francis B. Hayes,	4 00
Six named varieties, James Nugent,	3 00
Second, Edwin Fewkes,	2 00
Single named flower, Fancy or Self, E. Sheppard,	2 00
CUT FLOWERS.—Best display, and best kept during the exhibition, filling one hundred and fifty bottles, Hovey & Co.,	16 00
Second, Mrs. E. M. Gill,	14 00
Third, James Nugent,	12 00
BASKET OF FLOWERS.—Best arranged, and best kept during the exhibition, Mrs. E. S. Joyce,	5 00

Gratuities:—

Hovey & Co., Collection of Plants,	20 00
H. H. Hunnewell, " " "	15 00
S. R. Payson " " "	10 00
John L. Gardner, " " "	5 00
John L. Gardner, Plants,	2 00
Francis B. Hayes, Collection of Coleus,	3 00
William Patterson, Collection of Caladiums,	3 00
Henry Ross, Phloxes,	1 00
R. T. Jackson, Marigolds,	1 00
C. H. Hovey, "	1 00
Henry Ross, Calendula Meteor,	1 00
Hovey & Co., Ampelopsis,	1 00
A. W. Nelson, Jasmine,	1 00
George Craft, *Desmodium pendulæflorum*,	1 00
Daniel Duffley, Large Plant of Ivy,	5 00
Samuel Smith, Collection of Single Dahlias,	5 00
E. S. Smith, Seedling Pelargoniums,	1 00
William H. Spooner, Tropæolums and Marigolds,	3 00
John C. Hovey, Gaillardias,	1 00
John B. Moore & Son, Gladioli and Phloxes,	2 00
J. L. Willey, Collection of Dahlias,	3 00
Joseph Tailby, *Asparagus plumosus nanus*,	1 00
William C. Strong, Foliage of Trees and Shrubs,	2 00
J. W. Manning, Evergreens,	4 00

Hovey & Co., *Odontoglossum Skinneri*,	$1 00
Francis B. Hayes, Display of Flowers,	3 00
E. Sheppard, " " "	3 00
John B. Moore & Son, " " "	3 00
J. W. Manning, " " "	2 00
Miss S. W. Story, " " "	2 00
Mrs. E. M. Gill, " " "	2 00
Miss A. M. Tilley, Design of Dried Flowers and Grasses,	3 00
Charles H. Packer, Fern Decoration,	2 00
E. H. Hitchings, Collection of Solidagos,	2 00
Mrs. C. N. S. Horner, Native Flowers,	5 00
W. O. Currier, Basket of Grass of Parnassus,	1 00
Mrs. H. D. Wilmarth, *Viola lanceolata*,	1 00

SEPTEMBER 30.

Gratuity:—

E. Sheppard, Collection of Dahlias,	2 00

OCTOBER 7.

Gratuities:—

Macy Randall, Collection of Dahlias,	3 00
John L. Gardner, " " "	1 00
Charles J. Power, *Chrysanthemum inodorum*,	1 00
Miss Maria B. Forbes, Vase of Leaves and Asters,	1 00
Francis B. Hayes, Display of Flowers,	2 00
John Parker, " " "	1 00
Mrs. E. M. Gill, " " "	1 00

OCTOBER 14.

Gratuities:—

E. Sheppard, Collection of Dahlias,	1 00
John L. Gardner, " " "	1 00
Hovey & Co., Display of Flowers,	2 00

CHRYSANTHEMUM SHOW.

NOVEMBER 9 AND 10.

CHRYSANTHEMUMS.—Six Large Flowered, or Chinese, named, one plant in each pot, H. P. Walcott,	$8 00
Second, John L. Gardner,	6 00
Six Japanese, distinct named varieties, H. P. Walcott,	8 00
Second, John L. Gardner,	6 00
Four Pompons, distinct named varieties, H. P. Walcott,	4 00
Second, E. W. Wood,	3 00
Six Large Flowered or Chinese, in six inch pots, distinct named kinds, Patrick Malley,	5 00

Specimen Plant, Large Flowered or Chinese, named, H. P. Walcott,	$4 00
Second, H. P. Walcott,	3 00
Specimen Japanese, named, E. W. Wood,	4 00
Second, John L. Gardner,	3 00
Specimen Pompon, named, H. P. Walcott,	3 00
Second, E. W. Wood,	2 00
Best display of named plants, in pots, all classes, not less than ten varieties, E. W. Wood,	8 00
Second, H. P. Walcott,	6 00
Third, Marshall P. Wilder,	4 00
Twelve cut blooms, Large Flowered or Chinese, named, H. P. Walcott,	4 00
Second, Edwin Fewkes,	3 00
Third, E. W. Wood,	2 00
Six cut blooms, Large Flowered or Chinese, named, E. W. Wood,	3 00
Second, H. P. Walcott,	2 00
Third, B. G. Smith,	1 00
Twelve sprays of Pompons, named, E. W. Wood,	2 00
Second, H. P. Walcott,	1 00
Six sprays of Japanese, named, E. W. Wood,	2 00
Second, H. P. Walcott,	2 00
Display of named varieties, of any or all classes, thirty bottles, one variety in each, E. Sheppard,	5 00
Second, Norton Brothers,	4 00
Third, F. L. Ames,	3 00
Fourth, H. P. Walcott,	2 00
Fifth, E. W. Wood,	1 00
Orchids.—Three varieties in bloom, H. H. Hunnewell,	8 00
Single Plant, H. H. Hunnewell,	4 00
Second, James Cartwright,	3 00

Gratuities:—

Norton Brothers, Collection of Chrysanthemums,	4 00
Worcester Lunatic Hospital, Chrysanthemum Flowers,	1 00
Edwin Fewkes, " "	1 00
E. Sheppard, " "	1 00
Mrs. L. P. Weston, " "	1 00
Mrs. E. M. Gill, " "	1 00
H. H. Hunnewell, Collection of Plants,	5 00
Francis B. Hayes, " " "	5 00
F. L. Ames, Orchids,	3 00
Charles J. Power, Plants grown in Fertilized Moss,	1 00
Miss E. H. Craft, Design of Dried Flowers,	3 00
Miss S. W. Story, Display of Flowers,	1 00

DECEMBER 2.

Gratuities:—

E. Sheppard, Collection of Pelargoniums, ... $2 00
Miss S. W. Story, Display of Flowers, ... 1 00

SILVER MEDALS.

Azalea and Rose Show, March 23. Francis B. Hayes, New Azaleas.
" " " " " " Marshall P. Wilder, Collection of Azaleas.
" " " " " " F. L. Ames, Collection of Orchids.
June 3. Marshall P. Wilder, Seedling Azalea Mrs. Julia Wilder.
June 10. H. H. Hunnewell, Collection of Indian Azaleas.
Rhododendron Show, June 21. Francis B. Hayes, Rhododendrons and Azaleas.
" " " " H. H. Hunnewell, Rhododendrons.
Rose Show, June 30. Jackson Dawson, Roses of different countries.
July 15. John C. Hovey, *Opuntia Rafinesquiana.*
July 22. Mrs. C. N. S. Horner, Native Plants.
August 12. E. H. Hitchings, " "
September 2. Francis B. Hayes, Roses and Asters.
" " John C. Hovey, *Amaryllis Hallii.*
Annual Exhibition, September 19–22. S. R. Payson, *Asparagus plumosus nanus.*
" " " " H. H. Hunnewell, *Asparagus tenuissimus.*
Chrysanthemum Show, November 9 and 10. H. P. Walcott, Seedling Chrysanthemums President Wilder and President Parkman.

BRONZE MEDALS.

February 18. John L. Gardner, Two Plants Miles's Hybrid Mignonette.
" " E. M. Wood, Maréchal Niel Roses.
June 3. E. L. Beard, Fancy Pansies.
July 8. H. H. Hunnewell, *Lilium Wilsoni.*
" 29. Francis B. Hayes, Collection of Stocks.
August 5. R. T. Jackson, Hardy Native Ferns.
Annual Exhibition, September 19–22. Charles J. Power, Plants grown in Dumesnil Fertilizing Moss.

FIRST-CLASS CERTIFICATES OF MERIT.

February 11. John C. Hovey, *Lachenalia Wickii superba.*
" 25. Benjamin G. Smith, Carnation Wilkie Collins.
March 18. Francis B. Hayes, Roses Duke of Edinburgh and Mme. Lombard.
Azalea and Rose Show, March 23. Henry R. Comley, Seedling Carnations, Nos. 1 and 2.
" " " " " " Hovey & Co., Primula Cloth of Gold.
" " " " " " A. McLaren, *Orontium Japonicum variegatum.*
" " " " " " John L. Gardner, *Cytisus elegans.*

March 25. Ellwanger & Barry, Collection of Coniferous Trees.
April 1. Jackson Dawson, Rose Pierre Notting.
" 8. Francis B. Hayes, Azalea Roi des Roses.
April 15. E. M. Wood, *Lilium longiflorum floribunda.*
" " Sewall Fisher, Seedling Carnations.
" " Francis B. Hayes, *Bowea volubilis.*
" 22. E. Sheppard, Pelargoniums.
May 6. John C. Hovey, *Narcissus bicolor* Emperor and Empress,
June 21. George Craft, *Papaver orientale.*
" " Francis Parkman, Seedling Ghent Azaleas.
" " " " " Clematis.
" " George Craft, " Papavers.
Rose Show, June 30. John C. Hovey, *Brodiæa congesta.*
" " " " " " " *Gladiolus Byzantinus.*
July 8. E. L. Beard, Tuberous-rooted Begonias.
" " E. Sheppard, *Lilium Dalmaticum* and *L. Pomponium.*
" 29. Hovey & Co., Pelargonium Freak of Nature.
" " A. H. Fewkes, *Nicotiana affinis.*
" " John C. Hovey, *Ipomæa leptophylla.*
August 5. E. L. Beard, Seedling Gloxinias.
" 12. J. W. Clark, " Gladiolus, No. 20.
" " John C. Hovey, Gladioli Marie Lemoine and Lemoinii.
" " John B. Moore & Son, Seedling Phloxes, Nos. 11–26.
" 26. Francis B. Hayes, Aster Prince of Wales.
" " Edwin Fewkes, *Canna Ehemanni.*
September 2. C. H. Hovey, *Gaillardia picta Lorenziana.*
Annual Exhibition, September 19–22. Hovey & Co., Tuberous-rooted Begonias.
" " " " W. C. Strong, *Acer platanoides purpurea.*
October 7. William A. Bock, Seedling Pelargoniums.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1882.

By E. W. WOOD, CHAIRMAN.

The fruit crop the past season, though not as abundant as in 1880, has, with the exception of Peaches, been fair in amount and generally of good quality. The unusually severe cold on the fourth and fifth of October, 1881, did much injury to the fruit trees, as well as to the less hardy trees and shrubs; and the extreme cold during the winter entirely destroyed the fruit buds on the peach trees throughout the State, not a single specimen grown in open culture having been exhibited during the year, a circumstance unparalleled for many years. The trees have borne no fruit, but they have made a strong and more than usually healthy growth and give promise of an abundant crop next season.

The spring was later than usual, and it was found necessary to postpone the Rose and Strawberry Exhibition from June 27th to June 30th.

STRAWBERRIES. — The quantity shown was about the same as in past years; the quality was much better than last year. Our Strawberry Exhibition ought to be one of the most interesting of the year; but those who grow this fruit largely for market, find it for their interest to grow but few varieties, and can compete in but few classes; and though the amateurs and those who grow for family use cultivate more varieties, and are more inclined to test the new wonders introduced every season, they do not as generally exhibit as might reasonably be expected.

Of new varieties, nothing of marked prominence has been shown; the prize for two new varieties not previously exhibited was awarded to the Warren and Triple Crown. In awarding this prize, the Committee can only judge of size, beauty, and quality, having no means of knowing as to the desirability for general cultivation. Of the more prominent varieties recently introduced, the year's experience is not as favorable as we could wish. The Bidwell, while generally promising well in the first part of the season, failed to mature its crop; a better acquaintance with its merits may show that this is not usual. The Manchester may, from its vigor of growth and productiveness, be desirable for market purposes, but its quality will hardly make it desirable for the private garden. The Sharpless is evidently gaining in favor and being widely grown, both for sale and private use; its very large size and bright, clear color command the highest price, and among the varieties of large berries, it takes a high rank in quality. The Special Prize of a Silver Cup, for the best four quarts of any variety, was again awarded to the Sharpless, shown by Mr. George Hill, from Arlington.

Cherries were shown in larger quantity than last year. C. E. Grant, as usual, took a large share of the prizes with well grown, handsome fruit. No new varieties of special merit were shown during the season.

Currants were abundant and of good quality. Among the red varieties, La Versaillaise took all the first prizes. Of the white varieties, the Transparent, of French origin, shown by B. G. Smith, took the first prize. It was fully equal in quality and superior in appearance to the well-known Dana's Transparent, and would seem to be a valuable acquisition to this class of fruit.

Raspberries. — This fruit suffered more than usual from the severity of the winter, and the quantity shown was much below the average. No new varieties were shown. The first prize was awarded the Saunders, for superior quality. This variety deserves more general cultivation, especially among amateurs.

Blackberries. — We have been forcibly reminded of the necessity of a more hardy variety of this fruit, as in many places the vines were entirely destroyed during the winter. We had but one exhibit of blackberries the past season; A. S. McIntosh showed an excellent dish of the Dorchester variety.

Gooseberries. — This fruit was shown in more than the usual

quantity. The first prize for natives was awarded to Smith's Seedling. The exhibit of foreign varieties was the best for many years.

PLUMS. — The exhibits of this fruit continue to increase, the prizes having been all taken the past season. Several collections of from six to ten varieties were also placed in the general exhibition. The increase in the show of plums has been greater within the past ten years than that of any other fruit.

GRAPES.—The season has been favorable for the native varieties; and of the sixteen prizes offered at the Annual Exhibition, every one was awarded; and of the eighteen prizes offered at the October exhibition, twelve were awarded, the only varieties in which there was no competition being Massasoit and Wilder (Rogers's Nos. 3 and 4). Some specimens of Moore's Early, Concord, and Delaware, were very fine and deserve special mention.

The Empire State was shown at the Annual Exhibition, by James H. Ricketts, of Newburg, N. Y., the originator, who states that it is a cross between the Hartford Prolific and Clinton. The following description was made by the Secretary of this Society:

"Bunch of medium size, long and narrow, with a shoulder on one side, nearly six inches in length by three and a half inches across the shoulder, compact but not crowded. Berries round, green, with a white bloom; sweet, very juicy, with not much pulp,— but what there is is sour when bitten into. It was probably not quite ripe; if fully ripe, perhaps the pulp would disappear. It has a distinct Frontignan flavor, and is entirely free from any foxy quality. The skin is pretty thick."

FOREIGN GRAPES were shown in larger quantity than usual. There were no bunches of extra large size; but, as a whole, the fruit was well colored and of fine quality.

PEARS were not as abundant as last year, many trees showing no fruit buds. The Seckel was the only variety that produced a full crop. The drought in August and September affected unfavorably the size, especially of the later varieties, but the fruit ripened well, and was above the average in quality. The exhibits during the season have been creditable. Of the sixty-four prizes offered at the Annual Exhibition every one was awarded.

APPLES.—As a whole, the crop was not as large as two years

ago, but in some localities there was a full average yield. Of the sixty-one prizes offered at the Annual Exhibition forty-eight were awarded. There has been more than usual complaint of imperfect or worm-eaten fruit this season. Within the past few years, various means have been tried, with greater or less success, to stop the ravages of the canker-worm; but the injury from this pest is small, compared with that from the apple-worm or codling moth. The former is confined to a limited area; the latter takes undisputed possession of every orchard in the State. This seems to suggest an important subject for investigation by this Society, to ascertain some means by which this enemy may be stamped out from our orchards, otherwise most favorably located to produce the best fruit of its kind known.

No new entries for the Prospective Prizes have been made during the year; and, of those previously entered, the Hayes and Amber Queen grapes are the only ones to which the attention of the Committee has been called.

Of fruit exhibits during the year, aside from new varieties, the following seem to deserve special mention. March 23, Rodney Wallace showed Black Hamburg vines, in pots, one year old from the bud, with three and four fair-sized bunches of well-ripened fruit. July 15, E. P. Richardson showed his Seedling Strawberry, Garden City; the fruit was of good size and quality, and it would seem to be a desirable late variety. August 5, President Hayes showed, among Foreign Grapes, the Madresfield Court Muscat, which in quality has rarely, if ever, been excelled by any grapes shown at our exhibitions. If this variety proves vigorous and productive, it will deserve a place in every vinery. October 14, Edmund H. Hart, of Federal Point, Florida, sent specimens of the Japanese Persimmons recently introduced to this country, which proved very sweet, with a peculiar and pleasant flavor, unlike that of any other fruit, and with but little of the astringency which the persimmon is apt to possess. Mr. Hart states that the fruit of old trees is less astringent than that of younger ones. The fruit is yet very rare, even in Florida. The variety sent was the Mikado. The Committee awarded to Mr. Hart a First Class Certificate of Merit. October 28, Hon. Marshall P. Wilder showed two varieties of Japanese Persimmons, received from P. J. Berckmans, Augusta, Georgia.

The Committee have awarded during the year, in prizes and

gratuities, $858, leaving an unexpended balance of $92. Had there been the usual quantity of peaches shown, this balance would have been largely reduced.

In summing up the general result for the year, fruit growers may find much that is encouraging.

For domestic purposes the fruits have been above the average in quality. For market, the prices have been considerably above the average for the past ten years. The same quantity of apples grown this year in New England thrown upon the market ten years ago would have produced a surplus and consequent low prices, leaving a small margin of profit over the expense of picking and marketing; but, owing to the demand for export, the trade has been and is now active, and prices for a fair quality of apples have ranged from two to three dollars per barrel. The experience of this year among the dealers has proved that New England apples are far more desirable than Western for shipping. Buyers from Canada have been and are now in this market buying apples to ship to foreign ports.

An Ex-President of this Society was among the first to foresee and publicly predict the importance and value of the export trade in fruit; and this Society can hardly find a more interesting or profitable subject for its consideration than the best kinds and varieties of fruit for this trade, the best methods for their cultivation and the destruction of their insect enemies; thus giving aid and encouragement to fruit growers throughout the State.

Respectfully submitted,

E. W. Wood,
P. B. Hovey,
C. F. Curtis,
Benjamin G. Smith,
Jacob W. Manning,
Warren Fenno,

Fruit Committee.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

JANUARY 7.

Gratuities:—

Hovey & Co., King of Tompkins County Apples, ... $1 00
Mrs. H. V. Draper, Columbia Pears, ... 1 00

MARCH 18.

Gratuity:—

I. D. White, Collection of Pears, ... 1 00

MARCH 23.

WINTER APPLES.—Any variety, Warren Fenno, Roxbury Russet, . 3 00
Second, A. S. McIntosh, Rhode Island Greening, . . . 2 00
WINTER PEARS.—Any variety, Warren Fenno, Duchess of Bordeaux, ... 3 00
Second, Warren Fenno, Doyenne Phillippe, ... 2 00

MAY 13.

Gratuities:—

C. E. Grant, Pears, ... 1 00
Sylvester P. Morse, Roxbury Russet Apples, ... 1 00
George Dorr, " " " 1 00

JUNE 24.

Gratuities:—

Aaron D. Capen, Charles Downing Strawberries, . . . 1 00
William Doran & Son, " " " 1 00
Charles Garfield, Hervey Davis, " 1 00

ROSE AND STRAWBERRY SHOW.

JUNE 30.

Special Prize.

STRAWBERRIES.—Four quarts of any variety, George Hill, Sharpless, Silver cup, value, ... $25 00

Regular Prizes.

Four quarts Charles Downing, E. W. Wood, ... 3 00
Second, Aaron D. Capen, ... 2 00

Seth Boyden, E. W. Wood, ... $3 00
Sharpless, E. W. Wood, ... 3 00
Second, George V. Fletcher, ... 2 00
Two quarts Charles Downing, E. W. Wood, ... 2 00
Second, Aaron D. Capen, ... 1 00
Cutter's Seedling, E. W. Wood, ... 2 00
Duchess, L. W. Weston, ... 2 00
Second, Joseph D. Fitts, ... 1 00
Hervey Davis, John B. Moore & Son, ... 2 00
Jucunda, Joseph D. Fitts, ... 2 00
Second, C. E. Grant, ... 1 00
Miner's Great Prolific, John B. Moore & Son, ... 2 00
Second, L. W. Weston, ... 1 00
Monarch of the West, Joseph D. Fitts, ... 2 00
Pioneer, Aaron D. Capen, ... 2 00
President Wilder, Marshall P. Wilder, ... 2 00
Second, Horace Eaton, ... 1 00
Seth Boyden, E. W. Wood, ... 2 00
Sharpless, George V. Fletcher, ... 2 00
Second, C. N. Brackett, ... 1 00
Any other variety, Joseph D. Fitts, Great American, . . . 2 00
Second, Horace Eaton, Bidwell, ... 1 00
Collection, not less than six varieties, Joseph D. Fitts, . . 4 00
Two new varieties, not previously exhibited, Joseph D. Fitts, Warren and Triple Crown, ... 3 00
Fifty berries, any variety, George Hill, Sharpless, . . . 2 00
CHERRIES.—Two quarts, any variety, C. E. Grant, Black Heart, . 2 00
Second, C. E. Grant, Elton, ... 1 00
FOREIGN GRAPES.—Two bunches, any variety, Francis B. Hayes, Black Hamburg, ... 3 00
Second, Francis B. Hayes, Victoria Hamburg, ... 2 00

Gratuity:—

G. H. & J. H. Hale, South Glastonbury, Conn., Manchester Strawberries, ... 1 00

JULY 8.

STRAWBERRIES.—Two quarts of any late variety, C. E. Grant, Sharpless, ... 2 00
Second, C. E. Grant, Jucunda, ... 1 00
CHERRIES.—Black Eagle, C. E. Grant, ... 2 00
Second, Aaron D. Capen, ... 1 00
Black Tartarian, C. E. Grant, ... 2 00
Any other variety, C. E. Grant, Elton, ... 2 00
Second, James Nugent, Walsh's Seedling, ... 1 00

Gratuities:—

A. W. Nelson, Marion Strawberries, ... 1 00
Asahel Wheeler, Seedling Strawberry Local, ... 1 00

JULY 15.

CHERRIES.—Two quarts, any variety, C. E. Grant, Downer's Late,	$2 00
Second, C. F. Curtis, Black Tartarian,	1 00
RASPBERRIES.—Two quarts, any variety, William Doran & Son, Highland Hardy,	2 00
CURRANTS.—Four quarts of any Red variety, Benjamin G. Smith, La Versaillaise,	3 00
Second, C. E. Grant, Red Dutch,	2 00
Two quarts of any White variety, Benjamin G. Smith, Transparent,	3 00
Second, C. E. Grant, White Dutch,	2 00

JULY 22.

RASPBERRIES.—Two quarts, any variety, Warren Fenno, Saunders,	2 00
Second, William Doran & Son, Franconia,	1 00
CURRANTS.—Two quarts Dana's Transparent, Benjamin G. Smith,	2 00
Second, C. E. Grant,	1 00
La Versaillaise, Benjamin G. Smith,	2 00
Second, Wm. Doran & Son,	1 00
Victoria, Benjamin G. Smith,	2 00
Second, John L. Gardner,	1 00
Black Naples, Benjamin G. Smith,	2 00
Second, John L. Gardner,	1 00
Gratuities:—	
William Doran & Son, four varieties of Raspberries,	3 00
J. W. Manning, Souhegan Black Cap Raspberries, First-Class Certificate of Merit.	
Warren Fenno, Cherries,	1 00
C. N. Brackett, Seedling Cherry,	1 00
C. E. Grant, Collection of Currants and Raspberries,	1 00
B. G. Smith, June Berries,	1 00

JULY 29.

CURRANTS.—Two quarts of any Red variety, Benjamin G. Smith, La Versaillaise,	2 00
Second, C. E. Grant, La Versaillaise,	1 00
Two quarts of any White variety, Benjamin G. Smith, Transparent,	2 00
Second, Benjamin G. Smith, Dana's Transparent,	1 00
GOOSEBERRIES.—Two quarts of any Native variety, Benjamin G. Smith, Downing's Seedling,	2 00
Second, M. W. Chadbourne, Downing's Seedling,	1 00
Gratuities:—	
Francis B. Hayes, Foreign Grapes,	3 00
Warren Fenno, Gooseberries and Currants,	1 00

AUGUST 5.

BLACKBERRIES.—Two quarts, any variety, A. S. McIntosh, Dorchester,	$2 00
GOOSEBERRIES.—Two quarts of any Foreign variety, Benjamin G. Smith, Whitesmith,	2 00
Second, Benjamin G. Smith, Bang-Up,	1 00
PEARS.—Doyenne d' Été, Horace Eaton,	2 00
Second, Warren Fenno,	1 00
Any other variety, Warren Fenno, Madeleine,	2 00
Gratuities:—	
Francis B. Hayes, Foreign Grapes,	2 00
Winter Brothers, " "	3 00
Benjamin G. Smith, Gooseberries,	1 00

AUGUST 12.

APPLES.—Large Yellow Bough, C. Terry,	2 00
Second, Warren Heustis,	1 00
Red Astrachan, N. B. White,	2 00
Second, Benjamin G. Smith,	1 00
Any other variety, C. N. Brackett, Early Red Margaret,	2 00
Second, Warren Fenno, Tetofsky,	1 00
PEARS.—Beurre Giffard, John McClure,	2 00
Second, Benjamin G. Smith,	1 00
Gratuities:—	
Aaron D. Capen, Apples and Raspberries,	1 00
A. S. McIntosh, Blackberries,	1 00
M. W. Chadbourne, Currants,	1 00
Benjamin G. Smith, Gooseberries,	1 00

AUGUST 19.

APPLES.—Williams, C. E. Grant,	2 00
Second, B. G. Smith,	1 00
PEARS.—Clapp's Favorite, Warren Fenno,	2 00
Second, Mrs. E. M. Gill,	1 00
Manning's Elizabeth, Warren Fenno,	2 00
Second, Alexander Dickinson,	1 00
Any other variety, George Frost, Suprême de Quimper,	2 00
Second, Warren Fenno, Bloodgood,	1 00
Gratuities:—	
Francis B. Hayes, Foreign Grapes,	2 00
N. B. White, Apples,	1 00
Mrs. H. V. Draper, Peach Plums,	1 00
William Doran & Son, Currants and Raspberries,	1 00
John C. Weld, Orlando, Orange County, Florida Citrons, The Society's Silver Medal.	

AUGUST 26.

PEARS.—Bartlett, John McClure,	$2 00
Second, C. E. Grant,	1 00
Rostiezer, John McClure,	2 00
Second, M. W. Chadbourne,	1 00
Tyson, John C. Park,	2 00
Second, B. F. Hunt,	1 00
Any other variety, Horace Partridge, Belle Lucrative,	2 00
Second, Hovey & Co., Manning's Elizabeth,	1 00
PLUMS.—Any variety, B. G. Smith, Peach Plum,	2 00
Second, B. G. Smith, Bradshaw,	1 00
Gratuities:—	
M. W. Chadbourne, Apples,	1 00
Aaron D. Capen, "	1 00
Warren Fenno, Apples and Pears,	2 00
C. E. Grant, " " "	1 00
N. B. White, " " "	1 00
C. N. Brackett, " " "	1 00
Samuel Hartwell, " " "	1 00
John L. Bird, Tyson Pears,	1 00
Hovey & Co., Pears,	1 00
Horace Partridge, Foreign Grapes,	1 00

SEPTEMBER 2.

APPLES.—Any variety, B. G. Smith, Garden Royal,	2 00
Second, C. N. Brackett, Red and Green Sweet,	1 00
PEARS.—Bartlett, C. N. Brackett,	2 00
Second, John McClure,	1 00
Any other variety, Warren Fenno, Clapp's Favorite,	2 00
Second, Hovey & Co., Doyenne Boussock,	1 00
PLUMS.—Collection, not less than four varieties, Horace Eaton,	3 00
Second, Amos Bates,	2 00
Any one variety, Horace Eaton, Washington,	2 00
Second, B. G. Smith, Bradshaw,	1 00
NATIVE GRAPES.—Six bunches of any early variety, C. N. Brackett, Champion,	2 00
Second, B. G. Smith, Champion,	1 00
Gratuities:—	
Horace Partridge, Foreign Grapes,	1 00
B. G. Smith, " "	1 00
Mrs. H. V. Draper, Collection of Plums,	2 00
W. H. Slocum, Plums,	1 00
John B. Moore & Son, Apples,	1 00
N. B. White, Pears and Apples,	2 00
Samuel Hartwell, Pears and Apples,	1 00
Warren Heustis, Apples,	1 00

SEPTEMBER 9.

APPLES.—Gravenstein, Samuel Hartwell,	$2 00
Second, Warren Fenno,	1 00
Porter, C. N. Brackett,	2 00
Second, B. G. Smith,	1 00
Any other variety, Warren Fenno, Summer Pippin,	2 00
Second, C. N. Brackett, Red and Green Sweet,	1 00
PEARS.—Andrews, S. G. Damon,	2 00
Second, A. Dickinson,	1 00
Doyenne Boussock, C. N. Brackett,	2 00
Second, Hovey & Co.,	1 00
Any other variety, M. W. Chadbourne, Clapp's Favorite,	2 00
Second, C. E. Grant, Flemish Beauty,	1 00
GRAPES.—Delaware, S. G. Damon,	2 00
Hartford Prolific, S. G. Damon,	2 00
Moore's Early, John B. Moore & Son,	2 00
Second, B. G. Smith,	1 00
Any other variety, J. W. Talbot, Cottage,	2 00
Second, S. G. Damon, Adirondack,	1 00
Gratuities:—	
A. S. McIntosh, Pears,	1 00
Hovey & Co., "	1 00
C. E. Grant, Pears and Apples,	1 00
F. J. Dutcher, Plums,	1 00
Horace Partridge, Foreign Grapes,	1 00

ANNUAL EXHIBITION.

SEPTEMBER 19, 20, 21, AND 22.

Special Prizes.

Twelve Gravenstein Apples, John B. Moore & Son,	$5 00
Twelve Bartlett Pears, Mrs. Mary Langmaid,	5 00
Twelve Peaches, any variety, Robert C. Winthrop,	5 00
Twelve bunches Native Grapes, any variety, John B. Moore & Son, Moore's Early,	5 00

Regular Prizes.

APPLES.—Baldwin, William C. Eustis,	3 00
Second, A. S. McIntosh,	2 00
Third, John L. Bird,	1 00
Danvers Winter Sweet, C. N. Brackett,	2 00
Second, George S. Coe,	1 00
Dutch Codlin, A. S. McIntosh,	2 00
Second, B. G. Smith,	1 00

Fall Orange or Holden Pippin, S. Hartwell,	$2 00
Second, C. N. Brackett,	1 00
Fameuse, George V. Fletcher,	2 00
Second, B. G. Smith,	1 00
Foundling, Samuel Hartwell,	2 00
Garden Royal, J. W. Talbot,	2 00
Second, George S. Coe,	1 00
Golden Russet, B. G. Smith,	2 00
Second, Warren Fenno,	1 00
Gravenstein, Samuel Hartwell,	3 00
Second, George S. Coe,	2 00
Third, C. C. Shaw,	1 00
Hubbardston Nonsuch, M. W. Chadbourne,	3 00
Second, C. N. Brackett,	2 00
Third, George S. Coe,	1 00
Hunt Russet, Samuel Hartwell,	2 00
Second, C. N. Brackett,	1 00
King of Tompkins County, C. N. Brackett,	2 00
Second, W. C. Eustis,	1 00
Lady's Sweet, C. N. Brackett,	2 00
Leicester Sweet, O. B. Hadwen,	2 00
Lyscom, Aaron D. Capen,	2 00
Second, George S. Coe,	1 00
Mother, E. W. Wood,	2 00
Northern Spy, W. C. Eustis,	2 00
Second, George S. Coe,	1 00
Porter, T. C. Thurlow,	2 00
Second, George S. Coe,	1 00
Pumpkin Sweet, C. N. Brackett,	2 00
Second, S. G. Damon,	1 00
Rhode Island Greening, C. N. Brackett,	3 00
Second, J. L. D'Wolf,	2 00
Third, W. A. Crafts,	1 00
Roxbury Russet, J. L. D'Wolf,	3 00
Second, B. G. Smith,	2 00
Third, M. W. Chadbourne,	1 00
Talman's Sweet, Josiah Crosby,	3 00
Second, J. T. Foster,	2 00
Washington Royal, the second prize to O. B. Hadwen,	1 00
Washington Strawberry, Warren Fenno,	2 00
CRAB APPLES.—Hyslop, F. J. Dutcher,	2 00
Second, M. W. Chadbourne,	1 00
Montreal Beauty, John B. Moore & Son,	2 00
Transcendent, B. F. Hunt, Jr.,	2 00
Second, B. G. Smith,	1 00
Any other variety, B. G. Smith, Dartmouth,	2 00
Second, Horace Partridge, Yellow,	1 00

PEARS.—Bartlett, George S. Harwood,	$3 00
Second, Hovey & Co.,	2 00
Third, John L. Bird,	1 00
Belle Lucrative, Horace Eaton,	2 00
Second, John C. Park,	1 00
Beurre d' Anjou, Mrs. Mary Langmaid,	3 00
Second, John C. Park,	2 00
Third, Horace Eaton,	1 00
Beurre Bosc, Mrs. Mary Langmaid,	3 00
Second, John L. Bird,	2 00
Third, W. P. Walker,	1 00
Beurre Clairgeau, Mrs. Mary Langmaid,	3 00
Second, William T. Hall,	2 00
Third, Warren Heustis,	1 00
Beurre Diel, T. M. Davis,	2 00
Second, Mrs. Jesse Haley,	1 00
Beurre Hardy, Charles F. Curtis,	2 00
Second, Thomas P. Somes,	1 00
Beurre Superfin, John C. Park,	2 00
Second, Marshall P. Wilder,	1 00
Dana's Hovey, George Frost,	3 00
Second, M. W. Chadbourne,	2 00
Third, B. G. Smith,	1 00
Doyenne Boussock, George S. Harwood,	2 00
Second, Marshall P. Wilder,	1 00
Doyenne du Comice, Horace Eaton,	2 00
Second, John McClure,	1 00
Duchesse d'Angouleme, Mrs. Mary Langmaid,	3 00
Second, John C. Park,	2 00
Third, John L. Bird,	1 00
Goodale, Marshall P. Wilder,	2 00
Second, A. S. McIntosh,	1 00
Howell, W. S. Janvrin,	2 00
Second, C. N. Brackett,	1 00
Lawrence, Mrs. Mary Langmaid,	2 00
Second, John McClure,	1 00
Louise Bonne of Jersey, Mrs. Mary Langmaid,	2 00
Second, Horace Eaton,	1 00
Marie Louise, Hovey & Co.,	2 00
Second, John L. D'Wolf,	1 00
Merriam, Marshall P. Wilder,	2 00
Second, Charles F. Curtis,	1 00
Onondaga or Swan's Orange, Horace Eaton,	2 00
Second, Warren Fenno,	1 00
Paradis d'Automne, Marshall P. Wilder,	2 00
Second, Hovey & Co.,	1 00
Seckel, John C. Park,	3 00

Second, John L. Bird,	$2 00
Third, C. E. Grant,	1 00
Sheldon, A. S. McIntosh,	3 00
Second, Eben Snow,	2 00
Third, Mrs. Mary Langmaid,	1 00
Souvenir du Congrès, B. G. Smith,	2 00
Second, Warren Fenno,	1 00
St. Michael Archangel, Walker & Co.,	2 00
Second, T. M. Davis,	1 00
Urbaniste, Mrs. Mary Langmaid,	2 00
Second, John L. Bird,	1 00
Vicar of Winkfield, Hovey & Co.,	2 00
Second, William A. Morse,	1 00
Winter Nelis, Jacob Eaton,	2 00
Second, W. P. Walker,	1 00
Any other variety, Marshall P. Wilder, Clapp's Favorite,	2 00
Second, Walker & Co., Kingsessing,	1 00
PLUMS.—Collection of not less than four varieties, Horace Eaton,	4 00
Second, F. J. Dutcher,	3 00
Any one variety, F. J. Dutcher, McLaughlin,	2 00
Second, Mrs. H. V. Draper, Coe's Golden Drop,	1 00
NATIVE GRAPES.—Brighton, M. W. Chadbourne,	2 00
Second, Hovey & Co.,	1 00
Concord, William Doran & Son,	2 00
Second, Joseph S. Chase,	1 00
Delaware, B. G. Smith,	2 00
Second, Horace Eaton,	1 00
Massasoit, S. G. Damon,	2 00
Second, John C. Park,	1 00
Moore's Early, Horace Eaton,	2 00
Second, John B. Moore & Son,	1 00
Wilder, John B. Moore & Son,	2 00
Second, Marshall P. Wilder,	1 00
Worden, J. C. Lovell,	2 00
Second, Marshall P. Wilder,	1 00
Any other variety, S. G. Damon, Iona,	2 00
Second, B. L. Cullin, Harrington's Seedling,	1 00
FOREIGN GRAPES.—Four varieties, two bunches each, E. W. Wood,	8 00
Second, B. G. Smith,	6 00
Third, B. G. Smith,	4 00
Black Hamburg, two bunches, George Higginson,	4 00
Second, John L. Gardner,	3 00
Third, C. E. Grant,	2 00
Wilmot's Black Hamburg, John L. Gardner,	4 00
Second, D. W. Foster,	3 00
Muscat of Alexandria, Francis B. Hayes,	5 00
Any other variety, George Higginson, White Frontignan,	5 00
Second, John L. Gardner, " "	4 00

Gratuities:—

C. E. Grant,	Pears,	$3 00
M. W. Chadbourne,	"	3 00
Augustus Bacon,	"	2 00
T. M. Davis,	"	2 00
William T. Hall,	"	2 00
J. T. Foster,	"	1 00
William A. Morse,	"	1 00
John McClure,	"	1 00
C. N. Brackett,	"	1 00
Lewis Slack,	"	1 00
Hovey & Co.,	"	1 00
Marshall P. Wilder,	"	1 00
Warren Fenno,	Apples,	3 00
William T. Hall,	"	2 00
Samuel Hartwell,	"	2 00
C. N. Brackett,	"	2 00
B. G. Smith,	"	2 00
M. W. Chadbourne,	"	1 00
George S. Coe,	"	1 00
William A. Morse,	"	1 00
N. T. Apollonio,	Crab Apples,	1 00
A. T. Brown,	Quinces,	1 00
O. B. Hadwen,	Plums,	2 00
B. G. Smith,	"	1 00
Mrs. H. V. Draper,	"	1 00
George Tainter,	"	1 00
D. W. Foster,	Foreign Grapes,	1 00
Horace Partridge,	" "	2 00
James H. Ricketts,	Native Grapes,	2 00
Marshall P. Wilder,	" "	1 00
Joseph S. Chase,	" "	1 00
S. G. Stowe,	" "	1 00
Wm. Doran & Son,	" "	1 00
B. G. Smith,	" "	1 00
A. S. McIntosh,	" "	1 00
Mrs. Amanda Chandler,	" "	1 00
J. W. Talbot,	" "	1 00

SEPTEMBER 30.

Gratuity:—

D. W. Lothrop, Seedling Pears,	1 00

OCTOBER 7.

APPLES.—Holden Pippin, Samuel Hartwell,	2 00
Second, C. N. Brackett,	1 00
Gravenstein, Samuel Hartwell,	2 00
Second, W. P. Plimpton,	1 00

Mother, E. W. Wood,	$2 00
Second, B. G. Smith,	1 00
Porter, A. S. McIntosh,	2 00
Second, Samuel McIntosh,	1 00
Any other variety, Henry F. Coe, King of Tompkins County,	2 00
Second, M. W. Chadbourne, Hubbardston Nonsuch,	1 00
PEARS.—Beurre Bosc, Mrs. Mary Langmaid,	2 00
Second, John C. Park,	1 00
Beurre Clairgeau, W. P. Plimpton,	2 00
Second, William T. Hall,	1 00
Beurre Superfin, John C. Park,	2 00
Second, William A. Crafts,	1 00
Doyenne du Comice, W. P. Plimpton,	2 00
Second, John C. Park,	1 00
Duchesse d'Angouleme, Mrs. H. P. Kendrick,	2 00
Second, Charles F. Curtis,	1 00
Louise Bonne of Jersey, Mrs. Mary Langmaid,	2 00
Second, T. M. Davis,	1 00
Seckel, John C. Park,	2 00
Second, John L. Bird,	1 00
Sheldon, Mrs. H. P. Kendrick,	2 00
Second, Charles F. Curtis,	1 00
Urbaniste, Mrs. Mary Langmaid,	2 00
Second, Aaron D. Capen,	1 00
Any other variety, Mrs. Jesse Haley,	2 00
Second, Warren Heustis,	1 00
QUINCES.—Any variety, B. G. Smith,	2 00
Second, Horace Eaton,	1 00
NATIVE GRAPES.—Brighton, M. W. Chadbourne,	2 00
Concord, Horace Eaton,	2 00
Second, William Doran & Son,	1 00
Delaware, S. G. Damon,	2 00
Second, Horace Eaton,	1 00
Diana, S. G. Damon,	2 00
Second, Horace Partridge,	1 00
Isabella, J. V. Wellington,	2 00
Second, Miss Sarah W. Story,	1 00
Moore's Early, John B. Moore & Son,	2 00
Any other variety, S. G. Damon,	2 00
Second, B. G. Smith,	2 00
FOREIGN GRAPES.—Two bunches, any variety, J. L. Gardner, Black Hamburg,	3 00
Second, B. G. Smith, Muscat Hamburg,	2 00

Gratuities:—

A. S. McIntosh, Apples,	2 00
W. C. Eustis, "	1 00

C. N. Brackett, Pears,	$2 00
Augustus Bacon, "	2 00
M. W. Chadbourne, Pears,	2 00
Mrs. Jesse Haley, "	1 00
T. M. Davis, "	1 00
C. E. Grant, Pears and Apples,	2 00
S. G. Damon, Grapes,	1 00
B. G. Smith, Grapes and Apples,	2 00

OCTOBER 14.

Gratuities:—

John Foster, Brighton Grapes,	1 00
C. E. Grant, Pears,	1 00
Edmund H. Hart, Federal Point, Florida, Japanese Persimmons, First-Class Certificate of Merit.	

OCTOBER 21.

Gratuities:—

W. T. Carleton, Quinces,	1 00
Mrs. H. L. T. Wolcott, Raspberries,	1 00
William Read, Jr., Seckel Pears,	1 00
A. W. Nelson, " "	1 00

OCTOBER 28.

Gratuities:—

C. E. Grant, Pears,	2 00
A. McDermott, "	1 00
Aaron D. Capen, Pears,	1 00

NOVEMBER 4.

Gratuity:—

J. F. Heffernan, Quinces,	1 00

NOVEMBER 9.

French Premiums.

APPLES.—Baldwin, Samuel Hartwell,	2 00
Second, C. E. Grant,	1 00
Danvers Winter Sweet, C. N. Brackett,	2 00
Second, Warren Fenno,	1 00
Hubbardston Nonsuch, M. W. Chadbourne,	2 00
Second, C. N. Brackett,	1 00
Hunt Russet, Samuel Hartwell,	2 00
Second, Starkes Whiton,	1 00
King of Tompkins County, Edward Sumner,	2 00
Second, W. C. Eustis,	1 00
Lady's Sweet, C. N. Brackett,	2 00

Northern Spy, John B. Moore & Son,	$2 00
Second, W. C. Eustis,	1 00
Rhode Island Greening, C. N. Brackett,	2 00
Second, W. P. Plimpton,	1 00
Roxbury Russet, Cephas H. Brackett,	2 00
Second, Edward Sumner,	1 00

Society's Prizes.

PEARS.—Beurre d' Anjou, Mrs. Mary Langmaid,	2 00
Second, B. C. Vose,	1 00
Beurre d' Aremberg, John L. Bird,	2 00
Beurre Langelier, A. S. McIntosh,	2 00
Second, Warren Fenno,	1 00
Dana's Hovey, W. P. Plimpton,	2 00
Second, A. S. McIntosh,	1 00
Doyenne du Comice, W. P. Plimpton,	2 00
Second, Mrs. Jesse Haley,	1 00
Glout Morceau, A. S. McIntosh,	2 00
Second, Samuel McIntosh,	1 00
Josephine de Malines, Warren Fenno,	2 00
Second, John L. Bird,	1 00
Lawrence, Augustus Bacon,	2 00
Second, Miss Mary Langmaid,	1 00
Vicar of Winkfield, William T. Hall,	2 00
Second, C. N. Brackett,	1 00
Winter Nelis, T. M. Davis,	2 00
Second, Jacob Eaton,	1 00
Any other variety, Augustus Bacon, Beurre Diel,	2 00
Second, Warren Fenno, Beurre Gris d'Hiver,	1 00

Gratuities:—

A. S. McIntosh, Apples,	3 00
Samuel Hartwell, "	3 00
Charles W. Grant, "	1 00
Lyman Titus, "	1 00
J. W. Talbot, "	1 00
M. W. Chadbourne, Pears,	2 00
Augustus Bacon, "	2 00
Mrs. A. R. Gates, "	2 00
Jacob Eaton, "	1 00
Warren Heustis, Apples and Pears,	1 00
C. E. Grant, " "	1 00
B. G. Smith, Grapes and Apples,	2 00
Horace Partridge, "	1 00
Miss Sarah W. Story, "	1 00
John B. Moore & Son, "	1 00
Robert Manning, *Carya alba* (Shagbark Hickory),	1 00

REPORT

OF THE

Committee on Vegetables,

FOR THE YEAR 1882.

By C. N. BRACKETT, CHAIRMAN.

The season of 1882 opened under still more discouraging circumstances for the operations of the farm and garden than its predecessor. Rarely have we experienced a spring which has been more unfavorable for horticultural operations generally than the past. Planting was later, and replanting more general, than for many years, thereby causing delay, disappointment, and serious loss to the cultivator. Even the "oldest inhabitant," on being interviewed, fails to recollect a more unpropitious season. The loss caused by re-seeding alone, must in the aggregate have been very large.

On account of the unfavorable spring, and the long and unusually severe drought which followed, the prospect was so discouraging as to cause a sharp rise in values in many of the leading products of the farm and garden, which in some instances was kept up until the close of the season.

Later on, as the season advanced, the weather was more favorable to vegetable growth, and the welcome rains and deferred frosts made the growing period nearly, if not fully, of the average length. Many of our contributors sustained heavy loss from the long continued drought in July and August. On light and gravelly soils many crops were total failures, being literally burned up and past recovery before the much-needed rains came. Yet, notwithstanding all these drawbacks, contributors have managed to make

quite creditable exhibits during the season, and are deservedly entitled to the thanks of the Society for the interest they have manifested under so many trying and discouraging circumstances.

There has been some slight improvement noticed in the displays of forced vegetables, which have been made from time to time during the winter and spring, which we hope may be continued. Your Committee trust that, at no distant day, the appropriation for this department may be increased, so that they may be able to offer suitable prizes for these objects, which so large a number of our members are successfully engaged in growing.

From the beginning of the year to the Azalea Exhibition, March 23, contributions of forced vegetables were made by, and gratuities awarded to, the following persons: January 21 and 28, Francis B. Hayes, very fine and well grown specimens of Mushrooms and Rhubarb. January 21, Mushrooms from Hovey & Co. February 11, Tennisball Lettuce from Josiah Crosby. February 18, Lettuce from George W. Pierce and Josiah Crosby. February 25, Tomatoes and Mushrooms from Cephas H. Brackett. March 4, George W. Pierce showed some fine specimens of Tennisball Lettuce; Henry R. Comley, Tomatoes; and Josiah Crosby, Lettuce and Radishes. March 11, we had Parsley from M. W. Chadbourne, and Radishes and Lettuce from J. Crosby. March 18, Josiah Crosby showed Radishes and Tennisball Lettuce.

The exhibition of forced vegetables at the Azalea Show was more limited than it should have been, the only good specimens being those shown by Josiah Crosby; and of these it is sufficient praise to say that they maintained their accustomed standard of excellence. The weekly shows were, of course, more or less affected by the unfavorable character of the season, but not to the extent which at one time was anticipated.

On June 10 the first prize for Rhubarb was awarded to John C. Hovey for Monarch; weight of twelve stalks twenty-six pounds. This is a new and desirable variety, of excellent quality, and well worthy the attention of those who grow this plant for market. The specimens shown were taken from a crowded nursery row, and had received only ordinary cultivation. With plenty of room for growth, and with generous culture, the exhibitor thinks it may be grown to double the size and weight of the specimens shown by him.

Two weeks later, Levi Emery exhibited twelve stalks of Victoria

rhubarb, the weight of which was forty pounds. This weight has rarely, if ever, been surpassed at any previous exhibition of this plant.

Peas, although later than usual, were shown in great variety. The early kinds made their first appearance June 24, and were shown by M. W. Chadbourne. American Wonder took the first prize June 30, and Kentish Invicta the second. July 8, the Marvel was best and the Advancer second. Champion of England was exhibited as late as September 30, in good condition, by Samuel G. Stone.

Sweet Corn and Tomatoes were both, also, behind the usual time. The first exhibition of Corn was on July 29, C. N. Brackett receiving the first prize, for Marblehead Early. This is the sweetest and best of the early varieties, of fair market size, and, as such, a very valuable acquisition to every garden.

On the same date Samuel Hartwell showed the first Tomatoes of the season, winning the first and second prizes with Canada Victor and Gen. Grant respectively. From this time throughout the season, and especially at the Annual Exhibition, the display of this vegetable was extensive, and excellent in quality. The varieties which have been most popular are the Acme, Livingston's Perfection, Emery, and Paragon. Your Committee do not entertain a doubt that the Essex Hybrid, so called, is identical with the Acme, or a seedling so nearly resembling it, in color, quality, and habit, as to be undeserving a separate name.

The hot, dry weather of July and August was favorable for the Melon. The crop was abundant and the quality excellent. The finest specimens of the season were shown by George Hill, August 19 and 26, four of which more than filled a bushel box. Excellent specimens of Greenflesh melons were also exhibited at the Annual Exhibition by C. F. Curtis, Warren Heustis, and C. E. Calder, these gentlemen taking the prizes in the order named.

Upon the exhibition of the various root crops, no special comments are necessary; the displays have been abundant, and as satisfactory in quality as usual.

Early Cauliflowers this season were not a success; there was no competition for the prizes previous to the Annual Exhibition. At this exhibition John Cummings took both the special and the first regular prize offered for Cauliflowers.

The doleful accounts in regard to the condition of the various

crops, which your Committee were wont to receive from contributors, from week to week, during the season, led them to expect that, so far as this department was concerned, our Annual Exhibition was likely to prove a failure; but we were agreeably disappointed, as this exhibition surpassed that of the previous year, both in quantity, quality, and in the number of contributors. It was a success very gratifying to the Committee in charge, and highly satisfactory to the public, as well as to the members themselves.

The display of Potatoes was more extensive, of better quality, and the specimens were finer, than have usually been exhibited on such an occasion; a credit to any society, state, or country. Among the most attractive varieties of superior quality, we may name the Clark's No. 1, Beauty of Hebron, Early Rose, Brownell's Best, Early Telephone, Mayflower, Pride of America, Belle, Early Sunrise, White Elephant, Winslow's Seedling, Champion of America, and a new and very promising variety from Albert Bresee, of Hubbardton, Vermont (the originator of the Early Rose, and other valuable varieties), which he has named the Advance. With this new seedling came the following note:

"September 18, 1882.

"*To the Chairman of the Committee on Vegetables:*

"Today I send by express one peck of my new seedling potato, Advance, for exhibition and competition for prize No. 66. It ripens with the Early Rose, and I consider it superior to that fine variety in quality and yield. The season here has been very dry, and my Advance are not up to their usual size, color, or quality. I intend to enter them for the Prospective Prize next year.

"Yours very truly,

"ALBERT BRESEE."

If this new seedling should prove to be as early, hardy, productive, and of as good quality as the Early Rose, it will indeed be an acquisition, and of great importance to the country. The specimens were very handsome and attracted much attention, as did also the new seedlings from E. S. Brownell, Early Telephone and Brownell's Best, which were shown here for the first time at the Annual Exhibition last year, and described in our last report. Mr. Brownell has signified his intention to enter the Early Telephone

for the Prospective Prize as the best early, and Brownell's Best for the same prize as the best late potato.

A collection of nine unnamed seedlings was also exhibited by B. K. Bliss & Son, several of which we should judge, from their appearance, were worth proving.

The list of awards will indicate the exhibition of other objects concerning which we have nothing new to note. The annual appropriation by the Society for this department was $500; income from the Whitcomb fund, $30, making a total of $530. Of this amount the Committee have awarded $527, leaving an unexpended balance of $3.

With the annexed list of Awards of Premiums, this report is respectfully submitted.

C. N. Brackett,
Walter Russell,
Josiah Crosby,
George W. Pierce,
Samuel Hartwell,
C. E. Grant,
M. W. Chadbourne,
} *Vegetable Committee.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

JANUARY 21.

Gratuities:—

Francis B. Hayes, Mushrooms and Rhubarb,	$2 00
Hovey & Co., Mushrooms,	1 00

JANUARY 27.

Gratuity:—

Francis B. Hayes, Mushrooms and Rhubarb,	2 00

FEBRUARY 11.

Gratuity:—

Josiah Crosby, Lettuce,	1 00

FEBRUARY 18.

Gratuities:—

George W. Pierce, Lettuce,	1 00
Josiah Crosby, Lettuce and Radishes,	1 00

FEBRUARY 25.

C. H. Brackett, Tomatoes and Mushrooms,	1 00

MARCH 4.

George W. Pierce, Lettuce,	2 00
Henry R. Comley, Tomatoes,	2 00
Josiah Crosby, Lettuce,	1 00

MARCH 11.

Gratuities:—

M. W. Chadbourne, Parsley,	1 00
Josiah Crosby, Lettuce and Radishes,	2 00

MARCH 18.

Gratuity:—

Josiah Crosby, Lettuce and Radishes,	2 00

AZALEA AND ROSE EXHIBITION.

MARCH 23.

RADISHES.—Four bunches Turnip Rooted, Josiah Crosby,	$3 00
LETTUCE.—Four heads Tennisball, J. Crosby,	3 00

PARSLEY.—Two quarts, H. R. Comley,	$2 00
Second, William Patterson,	1 00
Gratuity:—	
H. R. Comley, Tomatoes,	2 00

APRIL 8.

Gratuities:—	
Walter Russell, Collection,	2 00
H. R. Comley, Tomatoes,	2 00
Josiah Crosby, Radishes and Lettuce,	2 00

APRIL 15.

Gratuities:—	
Henry R. Comley, Tomatoes,	1 00
C. H. Brackett, Cucumbers,	1 00

MAY 6.

Gratuities:—	
Josiah Crosby, Collection,	2 00
C. H. Brackett, Cucumbers,	1 00

MAY 13.

Gratuities:—	
George Dorr, Rhubarb,	1 00
C. H. Brackett, Cucumbers and Rhubarb,	2 00
M. W. Chadbourne, Rhubarb,	1 00
H. R. Comley, Tomatoes,	1 00

MAY 20.

Gratuity:—	
Walter Russell, Two varieties Radishes,	2 00

MAY 27.

Gratuities:—	
A. D. Capen, Asparagus and Rhubarb,	2 00
M. W. Chadbourne, Asparagus,	1 00
Josiah Crosby, Collection,	2 00

JUNE 3.

Gratuities:—	
Samuel Hartwell, Asparagus,	1 00
M. W. Chadbourne, Rhubarb,	1 00

JUNE 10.

CARROTS.—Twelve Short Scarlet, Josiah Crosby,	2 00
RADISHES.—Twelve Turnip Rooted, Walter Russell,	2 00
Long Scarlet, Walter Russell,	2 00
Second, Josiah Crosby,	1 00
ASPARAGUS.—Four bunches, J. B. Moore,	2 00
Second, Samuel Hartwell,	1 00

Cucumbers.—Pair, E. W. Wood,	$2 00
Second, J. Crosby,	1 00
Lettuce.—Four heads, J. Crosby, Tennisball,	2 00
Second, J. Crosby, Boston Curled,	1 00
Rhubarb.—Twelve stalks, John C. Hovey, Monarch, weight 26 lbs.	2 00
Second, M. W. Chadbourne, Victoria, weight 16½ lbs.	1 00
Gratuities:	
James Lawrence, Cauliflowers,	1 00
L. W. Weston, Asparagus,	1 00
Marshall P. Wilder, Cucumbers,	1 00
Walter Russell, Onions and Parsley,	1 00
Samuel Hartwell, Rhubarb,	1 00
C. E. Grant, "	1 00

June 24.

Gratuities:—	
M. W. Chadbourne, Peas, two varieties,	2 00
Levi Emery, Victoria Rhubarb; weight of twelve stalks, 40 lbs.,	1 00

ROSE AND STRAWBERRY SHOW.

June 30.

Beets.—Turnip Rooted, J. Crosby,	$2 00
Egyptian, J. Crosby,	2 00
Second, Samuel G. Stone,	1 00
Carrots.—Intermediate, J. Crosby,	2 00
Onions.—Twelve, J. Crosby,	2 00
Second, S. G. Stone,	1 00
Cucumbers.—Pair, E. W. Wood,	2 00
Second, J. Crosby,	1 00
Lettuce.—Four heads, Francis B. Hayes,	2 00
Peas.—Peck, C. E. Grant, American Wonder,	2 00
Second, S. G. Stone, Kentish Invicta,	1 00
Gratuities:—	
Samuel Hartwell, Peas,	1 00
George W. Pierce, Cucumbers,	1 00
Josiah Crosby, Collection,	1 00

July 8.

Onions.—Twelve, J. Crosby,	2 00
Second, S. G. Stone,	1 00
Squashes.—Four Long Warted, J. Crosby,	2 00
Peas.—Peck, J. L. Gardner, Marvel,	2 00
Second, S. G. Stone, Advancer,	1 00

Gratuities :—

Samuel Hartwell, Peas,	$1 00
C. E. Grant, "	1 00
S. G. Stone, "	1 00

Major J. F. Jones, Hogansville, Troup Co., Georgia, Wheat and Oats, First Class Certificate of Merit.

JULY 15.

Gratuities :—

Josiah Crosby, Collection,	2 00
Samuel G. Stone, "	2 00

JULY 29.

SQUASHES.—Four Marrow, J. Crosby,	3 00
SWEET CORN.—Twelve ears, C. N. Brackett,	3 00
Second, Samuel G. Stone,	2 00
TOMATOES.—Twelve, Samuel Hartwell, Canada Victor,	3 00
Second, Samuel Hartwell, Gen. Grant,	2 00

Gratuities :—

L. W. Weston, Early Rose Potatoes,	2 00
M. W. Chadbourne, Beauty of Hebron Potatoes,	2 00
C. E. Grant, Marblehead Corn,	1 00
S. Hartwell. Narragansett "	1 00
J. Crosby, two varieties Onions,	1 00

AUGUST 5.

SQUASHES.—Four Marrow, J. Crosby,	2 00
SWEET CORN.—Twelve ears, J. Crosby,	2 00
Second, C. E. Grant,	1 00
TOMATOES.—Gen. Grant, S. Hartwell,	2 00
Emery, S. Hartwell,	2 00
Any other variety, C. N. Brackett, Acme,	2 00
Second, S. Hartwell, Canada Victor,	1 00

Gratuities : —

L. W. Weston, Beauty of Hebron Potatoes,	2 00
Samuel G. Stone, Sweet Corn,	1 00
Samuel Hartwell, Collection,	1 00
C. E. Grant, "	1 00

AUGUST 12.

Gratuities :—

M. W. Chadbourne, Beauty of Hebron Potatoes,	1 00
J. Gardner, Peppers,	1 00
Samuel Hartwell, Tomatoes,	2 00
C. N. Brackett, Acme Tomatoes,	1 00
S. G. Stone, Corn,	1 00

C. E. Grant, Lima Beans,	$1 00
" " " Collection,	2 00
Francis B. Hayes, Artichokes,	1 00

AUGUST 19.

GREENFLESH MELONS.—Four, George Hill,	2 00
MUSKMELONS.—Four, the second prize to Samuel Hartwell,	1 00
Gratuities:—	
Mrs. E. M. Gill, Corn,	1 00
C. E. Grant, "	1 00
N. B. White, Potatoes,	1 00
Samuel Hartwell, Collection,	2 00
S. G. Stone, "	1 00
C. N. Brackett, "	1 00

AUGUST 26.

POTATOES.—Peck, J. Crosby, Early Rose,	2 00
Second, L. W. Weston, Beauty of Hebron,	1 00
LIMA BEANS.—Two quarts, B. G. Smith,	3 00
Second, C. E. Grant,	2 00
Third, W. K. Wood,	1 00
PEPPERS.—Twelve, C. N. Brackett,	3 00
Second, Josiah Crosby,	2 00
Gratuities:—	
George Hill, Greenflesh Melons,	3 00
M. W. Chadbourne, Collection,	2 00
S. Hartwell, "	2 00
C. N. Brackett, "	2 00
C. E. Grant, "	2 00

SEPTEMBER 2.

GREENFLESH MELONS.—Four, J. Crosby,	3 00
Gratuities:—	
Mrs. E. M. Gill, Collection,	1 00
C. N. Brackett, "	1 00
C. E. Grant, "	1 00

SEPTEMBER 9.

CELERY.—Four roots, the second prize to Josiah Crosby,	2 00
Gratuities:—	
J. Crosby, Melons,	1 00
C. L. Fowle, Tomatoes,	1 00
Samuel Hartwell, Collection,	2 00
C. E. Grant, "	3 00
C. N. Brackett, "	2 00

ANNUAL EXHIBITION.

SEPTEMBER 19, 20, 21, AND 22.

Special Prizes.

CAULIFLOWERS.—Best four, John Cummings, ... $5 00
CELERY.—Four specimens, J. Crosby, ... 5 00

Regular Prizes.

BEETS.—Twelve, Mrs. M. T. Goddard, ... 3 00
Second, George F. Stone, ... 2 00
Third, Josiah Crosby, ... 1 00
CARROTS.—Intermediate, George Hill, ... 3 00
Second, John Cummings, ... 2 00
Third, Walter Russell, ... 1 00
Long Orange, Walter Russell, ... 3 00
PARSNIPS.—Twelve, J. L. DeWolf, ... 3 00
Second, M. W. Chadbourne, ... 2 00
Third, Walter Russell, ... 1 00
POTATOES.—Four varieties, one peck each, C. N. Brackett, . . 4 00
Second, Mrs. M. T. Goddard, ... 3 00
Third, G. W. Jameson, ... 2 00
Early Rose, John Cummings, ... 3 00
Second, S. A. Merrill, ... 2 00
Third, G. W. Jameson, ... 1 00
Clark's No. 1, Henry Ross, ... 3 00
Second, Mrs. M. T. Goddard, ... 2 00
Third, G. W. Jameson, ... 1 00
Beauty of Hebron, L. W. Weston, ... 3 00
Second, C. B. Lancaster, ... 2 00
Third, G. W. Jameson, ... 1 00
Any other variety, Albert Bresee, Advance, ... 3 00
Second, C. B. Lancaster, White Elephant, ... 2 00
Third, Starkes Whiton, Champion of America, . . . 1 00
Collection of New Seedling varieties, B. K. Bliss & Son, Silver Medal.
SALSIFY.—Twelve, J. L. DeWolf, ... 3 00
Second, J. Cummings, ... 2 00
Third, George H. Rich, ... 1 00
TURNIPS.—Twelve Flat, George H. Rich, ... 3 00
Second, Francis B. Hayes, ... 2 00
Third, George Dorr, ... 1 00
Swedish, Mrs. M. T. Goddard, ... 3 00
Second, Francis B. Hayes, ... 2 00
Third, A. T. Brown, ... 1 00

ONIONS.—Peck of Danvers Yellow, J. Cummings,	$3 00
Second, J. Crosby,	2 00
Third, George Hill,	1 00
Red, J. Cummings,	3 00
Second, Walter Russell,	2 00
White, J. Cummings,	3 00
Second, Walter Russell,	2 00
Third, Josiah Crosby,	1 00
GREENFLESH MELONS.—Four, C. F. Curtis,	3 00
Second, Warren Heustis,	2 00
Third, C. E. Calder,	1 00
MUSKMELONS.—Four, J. Cummings,	3 00
Second, A. D. Capen,	2 00
Third, S. A. Merrill,	1 00
WATERMELONS.—Two, S. Lawrence,	3 00
Second, Samuel Hartwell,	2 00
Third, John Cummings,	1 00
SQUASHES.—Four Canada, George Dorr,	3 00
Second, C. E. Calder,	2 00
Third, J. Cummings,	1 00
Hubbard, S. W. Hathaway,	3 00
Second, Samuel Hartwell,	2 00
Third, George Hill,	1 00
Marblehead, S. W. Hathaway,	3 00
Second, J. Cummings,	2 00
Marrow, J. Cummings,	3 00
Second, George Hill,	2 00
Third, Warren Heustis	1 00
Turban, S. W. Hathaway,	3 00
Second, J. Cummings,	2 00
Third, Samuel Hartwell,	1 00
CABBAGES.—Four Drumhead, J. Cummings,	3 00
Second, Joseph Swan,	2 00
Third, Mrs. M. T. Goddard,	1 00
Red, J. Cummings,	3 00
Second, Mrs. M. T. Goddard,	2 00
Savoy, Three, J. Cummings,	3 00
Second, S. G. Stone,	2 00
Third, Mrs. M. T. Goddard,	1 00
CAULIFLOWERS.—Four, J. Cummings,	3 00
CELERY.—Four roots, J. Crosby,	3 00
Third prize, Henry Ross,	1 00
HORSERADISH.—Six roots, the second prize to Benjamin G. Smith,	2 00
LIMA BEANS.—Two quarts, B. G. Smith,	3 00
Second, S. G. Stone,	2 00
Third, C. E. Grant,	1 00

SWEET CORN.—Twelve specimens, John Cummings,	$3 00
Second, S. G. Stone,	2 00
Third, S. A. Merrill,	1 00
FIELD CORN.—Twenty-five ears, Mrs. M. T. Goddard,	3 00
Second, C. N. Brackett,	2 00
Third, Robert Elder,	1 00
EGG PLANT.—Four Round Purple, J. G. Coolidge,	3 00
Second, Walter Russell,	2 00
TOMATOES.—Three varieties, Samuel Hartwell,	4 00
Second, George W. Pierce,	3 00
Third, C. N. Brackett,	2 00
Acme, Twelve specimens, S. Hartwell,	2 00
Second, W. S. Janvrin,	1 00
Boston Market, S. Hartwell,	2 00
Second, C. E. Grant,	1 00
Emery, C. E. Grant,	2 00
Second, S. G. Stone,	1 00
Gen. Grant, C. E. Grant,	2 00
Second, S. Hartwell,	1 00
Any other variety, George Hill, Mayflower,	2 00
Second, S. G. Stone, Paragon,	1 00
MARTYNIAS.—Twenty-four, L. W. Weston,	2 00
Second, George W. Pierce,	1 00
OKRA.—Twenty-four, Mrs. M. T. Goddard,	2 00
Second, C. N. Brackett,	1 00
PEPPERS.—Twenty-four, George F. Stone,	3 00
Second, C. N. Brackett,	2 00
Third, C. E. Calder,	1 00
CRANBERRIES.—Half-peck, Miss Annie M. Tilley,	2 00
Second, J. W. Talbot,	1 00

Gratuities :—

John Cummings, Collection,	6 00
Samuel Hartwell, "	2 00
M. W. Chadbourne, "	2 00
C. N. Brackett, "	2 00
J. G. Coolidge, "	2 00
C. V. Whitten, "	1 00
Samuel G. Stone, "	1 00
M. B. Faxon, "	1 00
Robert Elder, Beets,	1 00
Aaron Low, Collection of Potatoes,	3 00
E. S. Brownell, Potatoes,	2 00
George W. Pierce, Melons,	1 00
Francis B. Hayes, "	1 00
S. A. Merrill, Squash,	1 00
E. Sheppard, Cucumbers,	1 00

C. E. Calder, Lettuce,	$1 00
Walter Russell, Horseradish,	1 00
Hiram Sibley & Co., New Dent Corn,	1 00
C. F. Smith, Rye,	1 00
C. E. Grant, Tomatoes,	1 00

SEPTEMBER 30.

Gratuity:—

Samuel G. Stone, Collection,	2 00

OCTOBER 7.

SALSIFY.—Twelve specimens, M. W. Chadbourne,	2 00
CABBAGES.—Three Drumhead, Mrs. M. T. Goddard,	2 00
Second, Samuel G. Stone,	1 00
Red, Mrs. M. T. Goddard,	2 00
Savoy, " " " "	2 00
Second, S. G. Stone,	1 00
BRUSSELS SPROUTS.—Half-peck, Mrs. M. T. Goddard,	2 00
CELERY.—Four roots, J. Crosby,	2 00
Second, W. Patterson,	1 00

Gratuities:—

Benj. G. Smith, Lima Beans,	1 00
G. W. Jameson, Barberries,	1 00
Horace Partridge, Potatoes,	1 00
Samuel G. Stone, Collection,	3 00
C. N. Brackett, "	2 00
C. E. Grant, "	2 00

OCTOBER 14.

Gratuity:—

C. E. Grant, Collection,	1 00

OCTOBER 21.

Gratuity:—

Samuel G. Stone, Collection,	1 00

OCTOBER 28.

Gratuities:—

Samuel G. Stone, Collection,	1 00
C. E. Grant, "	1 00

NOVEMBER 4.

Gratuity:—

Josiah Crosby, Celery,	2 00

NOVEMBER 9.

CAULIFLOWERS.—Four specimens, the second prize to J. L. Gardner,	$1 00
CELERY.—Four roots, Josiah Crosby,	2 00
Second, W. Patterson,	1 00
Gratuities:—	
Francis B. Hayes, Collection,	1 00
C. E. Grant, "	1 00
S. G. Stone, "	2 00
Cephas H. Brackett, Cucumbers and Tomatoes,	1 00

DECEMBER 28.

Gratuities:—	
William D. Philbrick, Lettuce,	1 00
Cephas H. Brackett, Tomatoes,	1 00

REPORT

OF THE

Committee of Arrangements,

FOR THE YEAR 1882.

The Committee of Arrangements respectfully submit the following report:

The several exhibitions, during the past year, have been well attended, and were satisfactory to the members of the Society and the public. Each one was carefully looked after and arranged, the Committee of Arrangements being divided into sub-committees, with special duties assigned to each, in order to facilitate the labor where so many details were to be attended to, and to prevent working to disadvantage. Sub-committees of three each, for fruits, flowers, and vegetables, were appointed to take charge of and arrange the tables of each department, to receive contributions and find places for contributors, and to see that all were satisfied with the disposition of the various products offered for exhibition, in which we believe there was no cause found for complaint.

A sub-committee, also of three, had charge of printing, advertising, and minor details, which required much care and forethought. All these sub-committees worked in harmony, the result of which has been good exhibitions that were highly gratifying to the numerous visitors.

It is not within our province to give any detailed or minute description of the various products exhibited, as this has already been done in the reports of the Committees on Fruits, Flowers, and Vegetables; and we need only allude to them in a general way, by saying that, notwithstanding the very hot and dry summer, from which all vegetation in this vicinity suffered much during the severe and protracted drought, the quantity and quality far surpassed expectation.

The receipts from the sale of tickets at the Azalea, Rose, Chrys-

anthemum, and Annual Exhibitions, have been satisfactory; the amount of money received was duly paid over to the Treasurer, and his receipts were taken therefor, the account of which can be found in his report, rendering a repetition unnecessary.

The interest shown by the public in the exhibitions of the Society during the year has been of the most encouraging kind. The constantly increasing love and taste for the cultivation of Fruits, Plants, Flowers, and Vegetables, give us every reason to believe that the most prosperous years of the Society are yet to come.

Evidence of the great progress made by the Massachusetts Horticultural Society in promoting an interest in gardening and the cultivation of new and improved varieties of fruits, flowers, and vegetables, can be seen not only in this vicinity, but everywhere; and, although more than fifty years have passed away since the Society was established, there is, as there always has been, a steady growth in its welfare and prosperity. At every meeting of the Society, new members are coming forward to engage in and continue the great and important work begun by its founders, which, thus far, has proved an inestimable blessing, and in the future will be of still greater benefit to the whole country.

C. H. B. BRECK, *Chairman.*

REPORT

OF THE

COMMITTEE ON PUBLICATION AND DISCUSSION,

FOR THE YEAR 1882.

Upon occasions like the present, we are inclined to glance backward over the past, and mark the progress made in Horticulture.

The meetings for discussion the past season, were the most successful series ever held by the Society.

Our thanks are due to the perseverance, energy, skill and science of a few large-hearted and philanthropic individuals, whose lives are monuments of industry, integrity, and usefulness, for the present advanced state of Horticulture in our country, and to no one man are we more largely indebted than to the distinguished head, for more than a third of a century, of the American Pomological Society, whose cheerful and hopeful nature and words of wisdom and encouragement, have stimulated many of us in our investigations and labors.

The Chairman would especially remember the services of his associate, John B. Moore, on whom, during the illness of the Chairman, the labor of providing and arranging for the meetings largely devolved, and who deserves the hearty thanks of all who have profited by these meetings, and indeed of all the members of the Society.

Let us not be satisfied with our present attainments. Let us compare our experience and results; let us stimulate each other to still greater exertions for the advancement of our common cause. Let us endeavor to disseminate the knowledge of the few among the many, that we may improve the public taste and confer on our country the blessings of our favorite art.

Horticulture is emphatically a peaceful occupation; it requires

science to direct, intelligence to guide, industry to accomplish, and a fee simple in the soil, for its successful management. And then, in the wide range of human effort, we know of no occupation more satisfactory.

But few copies of the History of the Society have been disposed of this year, and the Committee fear that the members do not appreciate this record of the work of the Society during the first fifty years of its existence. If they were aware of its value, a much larger number of copies would have been called for.

Prizes for essays were offered by the Committee this year, as in former seasons, but the number of manuscripts competing for the prizes has been quite limited, and the essays were not of sufficient interest for your Committee, after careful consideration, to accept.

We are again under special obligations to the Secretary for the thorough and admirable digest of the discussions, and supervision of all our printed reports.

Respectfully submitted for the Committee,

BENJAMIN G. SMITH, *Chairman.*

REPORT

OF THE

LIBRARY COMMITTEE,

FOR THE YEAR 1882.

The Committee on the Library offers the following as its Report for the year 1882.

The income of the Stickney fund has been expended as the giver directed, and the accessions to the Library from this source have been numerous, varied and important.

As Botany and Horticulture are the theoretical and practical sides of one subject, a science and an art mutually dependent, neither of which can be pursued with the highest success without the other, some books have been purchased whose bearing upon Horticulture is indirect, but which are no less useful on that account. Of such a nature are works on structural botany, upon the geographical distribution of plants, proceedings of scientific bodies, and the like.

It is not necessary to name many of the books bought during the year, as the titles of all purchases have been conspicuously posted as soon as the volumes were received, and a list of all accessions will be printed in connection with this report; but it may be well to call attention to our rare and ancient copies of "Fuchsius" and "Dodonæus," of date 1542 and 1583, respectively, and to the "Flora Austriaca," a magnificent work in five volumes, folio, with five hundred colored plates.

The Society's appropriation has been spent for periodicals and for binding as far as it would go; but the amount granted is not enough to enable us to bind all the periodicals received, and there is, at present, a considerable accumulation of these and of works issued in parts, all of which must necessarily be kept out of circulation until they are put into a form suitable for use. There are

also several periodicals not yet on our list, to which we ought to be subscribers.

Two years ago, the Library Committee recommended that two book-cases be placed against the western side of this room. In the first part of the present year, the busts which had long stood on brackets against the wall were removed with their supports, and a capacious book-case put in their place; but, large as the case was, it was almost immediately filled up, and, today, the Committee must, as for so many years before, call the attention of the Society to the fact that more room for books is needed.

Last year, the Committee stated in their report that two of the catalogues which had been sent to the Society by dealers were missing from the table. Not only have these not been returned, but others have disappeared during the year, as well as some of the agricultural papers. We, therefore, desire to repeat that these catalogues have been collected by means of much painstaking and correspondence, and that they are not for distribution. The Committee is very reluctant to remove them from the table where they are so accessible, and, therefore, earnestly requests all members of the Society to be as particular, when taking out these catalogues, to have them properly charged by the Librarian upon his record, as they would be in the case of any other book.

For many years past, the Committee has urged upon the Society the great need of a catalogue of its plates, representing that this necessity was increasing in the precise ratio of the increase of plates, of which we accumulate hundreds, if not thousands, every year. We are now very glad to announce that this work has been begun, and that substantial progress has been made. Early in the year the Executive Committee granted one hundred dollars for the purpose, and for that sum no less than thirteen thousand cards have been written. That is, we now have an index to thirteen thousand figures of plants, mostly colored, which before could have been found only by long search, and in many cases only by accident. The greater part of these cards have been verified by comparing them carefully with the plates, and as soon as a cabinet can be prepared to receive them, they will be arranged in alphabetical order, so that any person desiring to find a figure of any plant or fruit, can do so with a very slight expenditure of time. There are in our library, by careful estimate, almost a quarter of a million plates, hitherto almost as obscurely buried as the remains

of the mound-builders; but we may now indulge the hope that the work of exhuming them will go on steadily, until all this vast collection shall be so indexed that the figures of the plants which they represent may be found as readily as words in a dictionary. We are really coming into possession of these figures a second time, and for a very low price, when we consider the value of what we thus obtain.

For the Committee,

W. E. ENDICOTT, *Chairman.*

BOSTON, December 2, 1882.

LIBRARY ACCESSIONS.

BOOKS PURCHASED.

Fuchsius, Leonhartus. De Historia Stirpium Commentarii insignes, etc. Folio. 512 colored wood-cuts. Basle: 1542.

Matthiolus, Petrus Andreas. Commentarii in Libros sex Pedacii Dioscoridis Anazarbei de Medica Materia, etc. Apologia Adversus Amathum Lusitanum. Small folio. Many wood-cuts. Lugdunum: 1562.

Pena, Petro, et Matthia de Lobel. Medicis Nova Stirpium Adversaria, etc. Folio. 1,724 wood-cuts. Antwerp: 1576. The last part of the volume (comprising more than half) is P'antarum seu Stirpium Historia Matthiæ de Lobel Insulani; cui annexum est Adversariorum volumen. 1,411 wood-cuts.

Dodonæus, Rembertus. Stirpium Historiæ, etc. Folio. Many wood-cuts. Antwerp: 1583.

Clusius, Carolus. Rariorum Plantarum Historia, etc. Folio. 1,146 wood-cuts. Antwerp: 1601.

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Kentucky Horticultural Society. Proceedings, 1877–78, 1879, 1880, 1881. 4 pamphlets. 8vo. Louisville: 1878, 1879, and Frankfort: 1880, 1881. J. Decker, Recording Secretary.

Michigan State Horticultural Society. Eleventh Annual Report of the Secretary, 1881. 8vo. Lansing: 1882. T. H. Forster, Librarian. Extra copies for distribution. Catalogue of Fruits for 1882. Prepared by T. T. Lyon, President. 8vo. pamphlet. Lansing: 1882.

Iowa State Horticultural Society. Transactions for 1881. Edited by J. L. Budd, Secretary. 8vo. Des Moines: 1882. C. L. Watrous, President.

Minnesota State Horticultural Society. Transactions at the Fall Meeting, at Lake City, September 21 and 22, 1881, and the Winter Meeting at Minneapolis, January 16, 17, and 18, 1882. Prepared by U. S. Hollister, Secretary. 8vo. pamphlet. St. Paul: 1882. Oliver Gibbs, Jr., Acting Secretary.

Kansas State Horticultural Society. Report for the year 1881, Vol. 11. 8vo. Topeka: 1882. G. C. Brackett, Secretary.

American Pomological Society. Proceedings at the Eighteenth Session, held in Boston, Mass., September 14–16, 1881. Edited by the Secretary, W. J. Beal. 4to. Rochester, N. Y.: 1882. 4 copies. Hon. Marshall P. Wilder, President.

Fruit Growers' Association of Ontario, Canada. Reports for 1869, '71, '72, '73, '75, and '76. With Reports of the Entomological Society. 6 pamphlets. 8vo. Wood-cuts. Toronto: 1870–1877. D. W. Beadle, Secretary.

United States Department of Agriculture. Annual Report of the Commissioner for the year 1880. 8vo. Plates and charts. Washington: 1881. Hon. George B. Loring, Commissioner. 2 copies.

——— ——— ——— ———. Special Reports, Nos. 3, 4, 6, 11, and 16. 5 pamphlets. 8vo. Washington: 1877, '78, and '79. Edmund Hersey. Also, a copy of No. 43 from Henry Phelps.

——— ——— ——— ———. Special Reports, No. 38–52. Proceedings of a Convention of Agriculturists held in the Department of Agriculture, January 10–18, 1882. Florida, its Climate, Soil, Pro-

ductions, and Agricultural Capabilities. 17 pamphlets. 8vo. Washington: 1882. The Commissioner.

American Agricultural Association. Agricultural Review and Journal, January, 1882, Supplement, and August. 2 pamphlets. 8vo. New York: 1882. Joseph H. Reall, Secretary.

Maine Board of Agriculture. Twenty-fifth Annual Report of the Secretary, for the year 1881. 8vo. Augusta: 1882. Z. A. Gilbert, Secretary.

Maine State Agricultural Society, Maine State Pomological Society, and Androscoggin County Agricultural Society. Premium List of the Consolidated Exhibitions, Lewiston, September 26–29, 1882. 8vo. pamphlet. Augusta: 1882. Granville Fernald, Cor. Sec. Pom. Soc.

New Hampshire Board of Agriculture. First, Second, Third, Seventh, Eighth, Ninth, and Tenth Annual Reports; completing the set. 2 pamphlets and 5 volumes. 8vo. 1871–1881. William H. Hills.

Sanborn, J. W., Superintendent State Agricultural College Farm, Hanover, N. H. Farm Experiments. Fourth Series. 8vo. pamphlet. The Author.

Massachusetts Board of Agriculture. Twenty-ninth Annual Report of the Secretary, etc., for the year 1881. 8vo. Boston: 1882. John E. Russell, Secretary.

Essex Agricultural Society. Transactions for 1881, with the Fifty-ninth Annual Address, by Dr. James R. Nichols. 8vo. pamphlet. Salem: 1881. Charles P. Preston, Secretary.

Appleton, Francis H. Address before the Essex Agricultural Society at their Sixty-second Cattle Show and Fair. 8vo. pamphlet. Salem: 1882. The Author.

Connecticut Board of Agriculture. Fifteenth Annual Report of the Secretary, 1881–82. 8vo. Hartford: 1882. T. S. Gold, Secretary. 2 copies.

New Jersey State Board of Agriculture. Ninth Annual Report. 8vo. pamphlet. Orange, N. J., 1882. P. T. Quinn, Secretary.

New Jersey State Agricultural Society. List of Premiums at the Twenty-fourth Annual Fair, September 18, 1882. 8vo. pamphlet. Newark: 1882.

Hampton Normal and Agricultural Institute. Report for the year ending June 30, 1881. 8vo. pamphlet. Richmond: 1881. Also Treasurer's Report. 8vo. pamphlet. Hampton: 1881.

Georgia Department of Agriculture. Reports for 1881 and 1882. Supplemental Report for 1881. 8vo. pamphlets. Atlanta: 1882. J. T. Henderson, Commissioner.

Fern Creek [Kentucky], Farmers' and Fruit Growers' Association. Premium List of the Fourth Annual Fair. 8vo. pamphlet. Louisville: 1881. J. Decker, President.

Randolph County Agricultural, Horticultural, and Mechanical Association. Premium List of the Eleventh Annual Fair, Winchester, Indiana, September 12–15, 1882. 8vo. pamphlet. D. E. Hoffman, Secretary.

The Illustrated Journal of Agriculture, published by the Department of

Agriculture for the Province of Quebec, Vol. IV., Nos. 6 and 7, October and November, 1882. 4to. Charles Gibb.

Annales de la Sociedad Rural Argentina, revista quincenal de Ganaderia y Agricultura, Vol. 16, Nos. 1, 2, 4–10, 12–14, January to October, 1882. D. Enrique Sundblad, Director. Folio. Buenos Aires. The Director.

Kansas State Agricultural College. Nineteenth Annual Catalogue, 1881, 1882. 8vo. pamphlet. Manhattan: 1882. George T. Fairchild, A. M., President.

New York Agricultural Experiment Station. Bulletins Nos. 1–22 on slips. Geneva, July 24–December 27, 1882. Dr. E. L. Sturtevant, Director.

Houghton Farm. Description of Experiments with Indian Corn, 1880–81, by Manly Miles, Director of Experiments. The Rothamstead Experiments, by J. B. Lawes, Bart., F. R. S., LL.D. Small 4to. Plans. Cambridge: 1882. Professor D. P. Penhallow.

Ontario Agricultural College and Experimental Farm. Sixth Annual Report for the year ending 31st December, 1880. 8vo. pamphlet. Plans, etc. D. W. Beadle.

Rapport sur la Création d'un École de Jardinage a Bordeaux. 8vo. pamphlet. 1882. Ch. Joly.

Boston Park Commissioners. Third, Fourth, and Seventh Annual Reports. 3 pamphlets, 8vo. Boston: 1876 and 1881. One broadside and 2 pamphlets, 8vo. J. D. W. French. Also duplicates of the Fourth and Seventh Reports, from the City of Boston.

City of Boston, Document 153. Report of the Committee on Common, etc., in regard to the Planting of Trees, and general care of the Public Grounds, with accompanying Reports of the Superintendent and a Committee of Experts. December 1, 1882. 8vo. pamphlet. J. D. W. French.

Worcester Commission of Public Grounds. Annual Reports for 1870–1873, 1876, 1877, 1880, 1881. 8 pamphlets, 8vo. Worcester: 1871–1882. Edward W. Lincoln, Chairman.

Olmstead, Frederick Law. Mount Royal, Montreal. Square 12mo. Plan. New York: 1881. The Author.

——— ——. The Spoils of the Park; with a few leaves from the deep-laden note-books of "a wholly unpractical man." 8vo. pamphlet. February, 1882. The Author.

Brooklyn Park Commissioners. Fourteenth Annual Report, January, 1874. 8vo. pamphlet. 2 plates. Brooklyn, 1874. Edward H. Brundage.

Baltimore Park Commission. Annual Reports; 1st to 9th, 11th, 12th, 18th, 21st, and 22d. 14 pamphlets, 8vo. Baltimore: 1861–1881. The Commission.

Ottawa Field Naturalists' Club. Transactions, Nos. 1–3. 3 pamphlets. 8vo. Ottawa: 1880, 1881, and 1882. W. Hague Harrington, Secretary.

Boston Society of Natural History. Proceedings, Vol. 20, Part 4; Vol. 21,

Part 1. 2 pamphlets, 8vo. Memoirs, Vol. 3, No. 4. 4to. pamphlet. Boston: 1882. The Society.

Middlesex Institute. Annual Reports, 1881–1882. 8vo. pamphlet. Malden; 1882. The Institute.

St. Louis Academy of Science. Transactions, Vol. 3, No. 4; Vol. 4, No. 2. 2 pamphlets. 8vo. St. Louis: 1878, 1882. The Academy.

Acta Horti Petropolitani, Vols. 1–5, each in two parts, and Supplement to Vol. 3. 11 pamphlets. 8vo. St. Petersburg: 1871–1876. Charles S. Sargent.

Leopoldina. Amtliches Organ der Kaiserlichen Leopoldino-Carolinischen Deutschen Akademie de Naturforscher. Siebenzehntes Heft, Jahrgang, 1881. 4to. pamphlet. Halle: 1881. Dr. C. H. Knoblauch, President.

La Nature. Revue des Sciences et de leurs applications aux Arts et a l'Industrie. 17 June, 1882. Journal Hebdomedaire Illustré. Rédacteur en chef, Gaston Tissandier. Square 8vo. Wood-cuts. Paris. Ch. Joly.

La Science pour Tous. 15 Juillet, 1882. Revue Hebdomedaire Illustré. Rédacteur en chef, Paul Laurencier. 4to. Paris. Ch. Joly.

Smithsonian Institution. Annual Reports, 1868–1870, 1878–1880. 11 vols. 8vo. Washington: 1864–1882. The Smithsonian Institution.

Powell, J. W., Director. First Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution. 1879–1880. Royal 8vo. Many colored and other plates, and wood-cuts. Washington: 1881. The Smithsonian Institution.

Check List of Publications of the Smithsonian Institution, December, 1881. 8vo. pamphlet. Washington: 1881. The Smithsonian Institution.

List of Periodicals received at the Smithsonian Institution in 1880. From the Annual Report for 1880. 8vo. pamphlet. Washington: 1881. The Smithsonian Institution.

Gray, Dr. Asa. Memorial of Thomas Potts James. 8vo. pamphlet. Mrs. Isabella James.

Ellis, George E., D. D. Memoir of Jacob Bigelow, M. D., LL. D. Reprinted from the Proceedings of the Massachusetts Historical Society. Royal 8vo. Portrait. Cambridge: 1880. The Family of Dr. Bigelow.

Mount Auburn Cemetery. Annual Reports of the Trustees for 1878 and 1881. 2 pamphlets. 8vo. Boston: 1879, 1882. J. Harris Reed, Secretary.

United States Bureau of Education. Report of the Commissioner for the year 1880. 8vo. Washington: 1882. Circulars of Information, Nos. 1–6, 1881, and No. 1, 1882. 7 pamphlets. 8vo. Washington: 1881, 1882. Also, three other pamphlets and one broadside. Hon. John Eaton, Commissioner.

Massachusetts Institute of Technology. Seventeenth and Eighteenth Annual Catalogues of Officers and Students, etc., 1881–1882, 1882–1883. 8vo. pamphlets. Boston: 1881, 1882. The Institute.

Drury College, Springfield, Green County, Missouri. Ninth Annual Catalogue for the years 1881–1882. 8vo pamphlet. Springfield: 1882. Rev. Nathan J. Morrison, D. D., President.

Goodwin, Rev. Daniel R., D. D., LL. D. Longfellow Memorial Address before the Alumni of Bowdoin College, July 12, 1882. 8vo. pamphlet. Portland: 1882. Librarian of Bowdoin College.

Lynn Public Library. Nineteenth Annual Report of the Trustees, for the year 1881. 8vo. pamphlet. Lynn: 1882.

Georgetown Peabody Library. Catalogue. 8vo. Salem: 1869, with Supplement, 1877. Also, Bulletin Nos. 1 and 2, 1879, and No. 3, 1881. 1 volume and 3 pamphlets. 8vo. Henry M. Nelson.

Mercantile Library Association of the City of New York. Sixty-first Annual Report of the Board of Direction. 8vo. pamphlet. New York: 1882.

Library Company of Philadelphia. Bulletin, January, 1882. 8vo. pamphlet. The Company.

Ewer, W. B. The California Silk Growers' Manual. Published under the direction of the California Silk Culture Association. 8vo. pamphlet. Wood-cuts. San Francisco: 1882. The Author.

Joly, V. Ch. Traité Pratique du Chauffage, de la Ventilation et de la Distribution des Eaux dans les Habitations Particulières a l'Usage des Architectes, des Entrepreneurs, et des Propriétaires. 2d edition. 8vo. 375 wood-cuts. Paris: 1873. The Author.

Sarcey, Francisque. Les Odeurs de Paris; Assainissement de la Seine. Royal 8vo. pamphlet. Paris: 1882. Ch. Joly.

National Association of Wool Manufacturers. Bulletin, January, 1881, to December, 1881. Edited by John L. Hayes, LL. D., Secretary. Vol. 11. 8vo: Boston: 1881. The Association.

Kasson, John A. Speech on the Tariff and Tax Commission, House of Representatives, Saturday, May 6, 1882. 8vo. pamphlet. Washington: National Association of Wool Manufacturers.

Donnell, E. J. Slavery and "Protection;" An Historical Review and Appeal to the Workshop and the Farm. 8vo. pamphlet. New York: 1882. The Author.

Allan, J. T. Nebraska and her Territories, as developed by Railroad Building and Operation.

———. Central and Western Nebraska and the Experiences of its Stock Growers.

———. Western Nebraska and the Experiences of its Actual Settlers. 3 pamphlets. 8vo. Published by the Union Pacific Railway Company's Land Department. Omaha: 1882.

New-England Historic Genealogical Society. Proceedings at the Annual Meeting, January 4, 1882. 8vo. pamphlet. Boston: 1882. The Society.

American Antiquarian Society. Proceedings, Vol. I., Part 3, and Vol. II., Part 1, New Series. 8vo. pamphlet. Worcester: 1882.

Periodicals Purchased.

English. — Gardeners' Chronicle.
Gardeners' Magazine.
Journal of Horticulture and Cottage Gardener.
The Garden.
Gardening Illustrated.
Curtis's Botanical Magazine.
Florist and Pomologist.
Journal of Botany.
Country Gentleman's Magazine.
Journal of Forestry.

French. — Revue Horticole.
Revue des Eaux et Forêts.

Belgian. — Illustration Horticole.
Flore des Serres.
Belgique Horticole.
Revue de l' Horticulture, Belge et Étrangère.

German. — Botanische Zeitung.
Gartenflora.

American.—Country Gentleman.
American Journal of Forestry.
American Naturalist.

Periodicals Presented.

Gardener's Monthly.
Canadian Horticulturist.
Ladies' Floral Cabinet.
Semi-Tropic California.
American Garden.
Vick's Illustrated Monthly Magazine.
American Florist and Farmer.
Seed Time and Harvest.
Bulletin of the Torrey Botanical Club.
Botanical Gazette.
The Scientific Roll.
Maine Farmer.
Home and Farm.
New England Farmer.
Massachusetts Ploughman.
American Cultivator.
New England Homestead.
American Agriculturist.
Rural New Yorker.
American Rural Home.
Maryland Farmer.

Florida Dispatch.
Prairie Farmer.
The Industrialist.
Pacific Rural Press.
Boston Daily Advertiser.
Boston Morning Journal.
Boston Post.
Boston Daily Globe.
Boston Evening Transcript.
Daily Evening Traveller.
The Cottage Hearth.

Books, Etc., Wanted.

☞ *Persons having any of the books in the following list to dispose of will oblige by addressing the "Librarian of the Massachusetts Horticultural Society, Horticultural Hall, Boston."*

Bolton's Filices Britannicæ, Part 2. 4to. Huddersfield, 1790.
Sowerby's English Botany, Supplement to the 1st edition; Vol. 5, including all the plates beyond No. 2,960.
Curtis's Beauties of the Rose,—all but the volume for 1850. 4to. London and Bristol.
Nestel's Rosengarten, 1870 and onward. Stuttgart.
Murray, Andrew, On the Synonymy of various Conifers,—all but Part 1.
Endlicher's Genera Plantarum,—all the Supplements but the first.
Lindley's Folia Orchidacea, Part 9.
Floral World, 1866.
Revue Horticole, founded 1829, volumes prior to 1847.
U. S. Entomological Commission, Bulletins 3, 4, and 5. Also First Report on the Rocky Mountain Locust.
Illinois Entomological Reports,—all beyond the 4th.
United States Patent Office, Agricultural Reports, 1839, 1842, 1843.
U. S. Department of Agriculture, Special Reports 14 and 15.
Virginia Commissioner of Agriculture, First Annual Report.
Royal (London) Horticultural Society's Journal, between Vol. 9, 1854, and Vol. 6 [New Series?], 1880.
Annales de la Société d'Horticulture de Paris, January, 1832.
Journal de la Société Centrale d'Horticulture de France, June 1868.
Bulletin de la Société d'Horticulture du Département de la Seine Inferièure (formerly Société de Rouen), Tome 5, Cahier 4; Tome 7, Cahier 1; Tome 14, Cahier 2. Also Tome 2, Cahier 8; Tome 3, Cahiers 2 and 6; being Cahiers 1, 2, and 3 of Tome 1 of Pomologie (pp. 1–52, 53–76, and 77–108). Also Tome 1, Cahier 6, Pomologie (pp. 159–175); Tome 2, Cahier 3, Pomologie.
Reports of the Iowa State Horticultural Society,—all previous to 1869; also 1870, 1871, 1874.

Iowa Forestry Annual,—all but No. 5, 1879.

Minnesota State Forestry Association, Forest Tree Planters' Manual,—all but 1879 and the second edition of the same, 1880.

Nebraska Horticultural Society, Transactions, other than 1871, 1872, and 1877.

American Agricultural Association, Review and Journal, January, 1882, and May, 1882.

New England Farmer. 4to. Vol. 8; No. 49, June 25, 1830; Vol. 24, Nos. 3, 17, 21–24, 27, 29, 32, 35, 36, 38–48, 50, 51 (1845–1846). Also Title-page and Index.

New England Farmer. 8vo. 1864. Part of Vol. 16.

American Agriculturist, Vol. 1, No. 2; Vol. 2, No. 1; and Vols. 9, 11, 15, 22, and 23.

Country Gentleman, Vol. 2, Nos. 27, 28, 29, and 30. Also Title-page and Index.

The California Horticulturist, Vols. 7 and 8, and the Jan., Feb., March, April, and July numbers of Vol. 9.

Semi-Tropic California, January 1881 and March 1882.

The Semi-Tropical (Jacksonville, Fla.), Vol. 1, 1875, and the March number of Vol. 3.

Report of the Secretary and Librarian,

FOR THE YEAR 1882.

I wish it were in my power to present a report in which I could relate the occurrence of events that should largely increase the power of the Society to promote the object for which it was established,—the improvement of the science and art of horticulture. Instead of this, I must be content with the more humble task of reporting the diligent performance of work, largely of a routine nature, and, therefore, differing but little from year to year; and, at this late stage of the meeting, it can hardly be desired that I should occupy your time in particularizing this work, and, therefore, I will only say, that though the number of meetings for discussion the last season was materially increased, and, consequently, the labor of making notes of the discussions and preparing them for the press, the TRANSACTIONS have been published earlier than last year, and it is hoped that a still further gain may be made in the coming year.

Special attention has been given during the last year to the exchange of our TRANSACTIONS with other societies, and in this way many valuable additions have been made to the library, the most important of which consists of twenty-three volumes of the "Bulletin de la Société Nationale et Centrale d'Horticulture de France," making our set of the publications of that Society nearly complete, from its foundation in 1826 to 1870.

As Librarian, I would say that the work of perfecting the incomplete sets of periodicals, and other works in the library, has continued to engage my attention. Much inquiry and correspondence is necessary in this work, and many abortive efforts are often made, and many disappointments experienced, before the right clue is found, but by persevering effort, several valuable sets of books have had their deficiencies supplied, the most important of which is, perhaps, the Gardener's Chronicle, of which we now possess a complete set from its foundation in 1841. The volume

or number required to complete a set may not be of great value in itself, yet, as making the difference between the perfection and imperfection of an important work, it may be invaluable. A list of some of the desiderata in this direction, will be found appended to the report of the Library Committee, and the attention of any who may have any of the publications mentioned to dispose of, is solicited to it.

The completion of any work renders it desirable that it should be bound for preservation and use. The appropriation heretofore made, has been but little more than sufficient for the subscription and binding of the periodicals taken, and, consequently, many unbound volumes have accumulated. The number of these has been increased during the past year by the completion of imperfect sets, and I trust that the Society will approve the recommendation of the Executive Committee, to appropriate an increased sum for this purpose, in order that the books may be made available for use.

The new book-case, placed in the library room the present year, has not only afforded room for the storage of books, thereby relieving, in some degree, the crowded condition of the other book-cases, but opportunity to classify the books to an extent not possible before. In it have been placed, besides some of the most valuable works on general and local botany, all our books on Ferns, on Arboriculture, and on Pomology including Fruit Culture, — three of the most important subjects within the scope of the library. These books were previously scattered through the library, but any one desiring to study either of these subjects, can now ascertain, at a glance, what the library contains upon it. While many works still remain to be acquired on these subjects, it is yet a satisfaction to know that the Society already possesses so many valuable books upon all of them. It is intended to continue the work of classifying the books and bringing together those upon the same subject, as time shall permit.

The important work commenced during the year of preparing a card catalogue of the plates of plants, flowers, and fruits, has occupied a portion of my time, though much less than would have been demanded but for the intelligence, care, and accuracy brought to the work by the person employed by the Library Committee. The importance of this work may not be generally understood, but those who have occasion to look for any plate of a plant or fruit will appreciate it, and those who have not would see its import-

ance if they should look for any particular plate among the more than two hundred thousand in the library, without the assistance of such a catalogue as is proposed. Even supposing the hundreds, if not thousands, of volumes containing these plates to be thoroughly and accurately indexed, which is not always the case, it is obvious that the labor of consulting all these indexes, would be too great to be often undertaken. The present Chairman of the Library Committee, when urging in his first report, the importance of this work, expressed the opinion that the usefulness of the library would be doubled if such a catalogue were in existence, and I do not think that this estimate of its value is too high.

ROBERT MANNING,
Secretary and Librarian.

TREASURER'S REPORT,

FOR THE YEAR 1882.

RECEIPTS.

Cash on hand as per last report,	$2,635 62
Rent of Halls,	8,218 65
" " Stores,	10,174 98
From Telegraph Companies for damage to roof,	162 50
Admissions and Assessments,	810 00
Sale of History,	17 00
Sale of Duplicate Books,	2 50
" " " " Stickney Fund,	5 75
Mount Auburn Cemetery,	3,954 81
Annual Exhibitions,	579 50
Special Grape Prizes,	100 00
	$26,661 31

EXPENDITURES.

Labor,	$909 23	
Salaries,	2,191 69	
Incidentals,	203 09	
Interest,	3,860 96	
Taxes,	3,397 50	
Repairs on Building,	229 61	
Heating and Water, less paid by tenants,	649 07	
Lighting,	987 38	
Furniture and Fixtures,	374 09	
Prizes,	2,564 40	
Annual Exhibitions,	481 63	
Committee of Arrangements,	250 00	
Garden Committee,	14 85	
Committee on Publication and Discussion,	95 00	
Stationery, Postage, and Printing,	1,112 38	
Stickney Fund,	705 75	
Library,	202 50	
Card Catalogue of Plates,	99 80	
Cash on hand December 31, 1882,	8,332 38	
		26,661 31

ASSETS.

Real Estate, Furniture, and Exhibition ware,			$256,585 56
Library last year,	$20,746 12		
Added this year,	900 00		
		21,646 12	
Bonds, C., B. & Q. R. R., at par,		1,500 00	
Stereotype Plates, and copies of History,		404 50	
Cash on hand December 1, 1882,		8,332 38	
			$288,468 56

LIABILITIES.

Mortgage debt, bearing interest at 5½ per cent., due September, 1883,	60,000 00		
Loan, without interest, payable to Harvard College in 1899,	12,000 00		
Note payable to Massachusetts National Bank,	12,000 00		
		84,000 00	
Surplus,			$204,468 56

MEMBERS.

Number of Life Members by last report,		582		
Added during the year,		8		
		590		
Deceased,	7			
		7		
		583		
Annual Members,	275			
Added,	13			
	288			
Deceased, 4				
Discontinued, 10				
	14			
		274		
				857
Income from membership:				
8 Life Members,		$240		
13 Annual Members,		130		
220 Assessments,		440		
				$810 00

The Finance Committee having audited the accounts of the undersigned, made and have subscribed to on a book kept for that purpose, the following report:

The Massachusetts Horticultural Society in account with GEO. W. FOWLE, *Treasurer.*

By balance in treasury, December 31, 1882, . .	$2,635 62
" Total income as per receipt book, . . .	24,025 69
	$26,661 31

Contra.

To cash paid out as per disbursement book, . .	$18,328 93
Balance to new account, ...	8,332 38
	$26,661 31

BOSTON, February 2, 1883. We have examined the above account, and find it correct, and the balance of cash on hand eighty-three hundred and thirty-two dollars and thirty-eight cents, as stated.

(Signed) H. H. HUNNEWELL, } *Finance*
FRANCIS B. HAYES, } *Committee.*

The income of the Society the past year has been increased by receipts from the Proprietors of Mount Auburn Cemetery, and from rental of the Halls, both in excess of the previous year. That from the Halls would have been still greater if former prices could have been obtained; but this could not be, owing to the increase of the number of halls in our city, creating much competition.

The Treasurer hopes that the contemplated improvements in the stores will so augment the receipts that the building shall be let only for such purposes as will, in all respects, promote the welfare of the Society.

GEO. W. FOWLE, *Treasurer.*

BOSTON, February 3, 1883.

Dr. *Massachusetts Horticultural Society, in account with the Proprietors of the Cemetery of Mt. Auburn.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31st, 1882.

Cost of filling up and improving land at Mt. Auburn, for the year ending December 31, 1882; the Massachusetts Horticultural Society being charged with their proportion of the same:		By Sales in January,	$15 00
Pearl Avenue to Eagle Avenue,	$2,090 13	" " " February,	15 00
Swan Avenue to Magnolia Avenue,	78 75	" " " March,	2,550 98
Ivy Park,	534 50	" " " April,	1,285 00
Chant Lot,	365 25	" " " May,	2,631 50
	$3,068 63	" " " June,	1,676 16
		" " " July,	590 00
		" " " August,	1,175 00
		" " " September,	3,627 00
		" " " October,	2,792 75
		" " " November.	3,091 75
		" " " December,	348 75
		Net amount receipts from Receiving Tomb,	499 00
			$20,297 89
One-quarter of $3,068.63 is	$767 16	Less grave repurchased,	10 00
			$20,287 89
Balance due Massachusetts Horticultural Society,	3,954 81	Deduct for Annual Expenses,	1,400 00
		Mass. Horticultural Society one-fourth part of	$18,887 89
	$4,721 97		$4,721 97

E. & O. E.

December 26, 1882.

H. B. MACKINTOSH, *Treasurer.*

MASSACHUSETTS HORTICULTURAL SOCIETY,

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during 1882:

Pearl Avenue to Eagle Avenue (Stone Farm).

476¾ days, men,	$953 50		
324¾ " man and horse,	1,136 63		
		$2,090 13	

Swan Avenue to Magnolia Avenue.

22½ days, man and horse,		78 75

Ivy Path.

267¼ days, men,		534 50

Chant Lot (near Lantana Path).

27¾ days, men,	$55 50	
88½ " man and horse,	309 75	
		365 25
		$3,068 63
One-fourth part of $3,068.63 is		$767 16

J. W. LOVERING, *Supt.*

MOUNT AUBURN, Dec. 30, 1882.

I certify the foregoing to be a true copy of accounts of improvements for the year 1882, rendered by the Superintendent.

H. B. MACKINTOSH, *Treasurer.*

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1883.

President.

FRANCIS B. HAYES, of Boston.

Vice-Presidents.

JOHN B. MOORE, of Concord.
JOHN CUMMINGS, of Woburn.
BENJAMIN G. SMITH, of Cambridge
CHARLES H. B. BRECK, of Boston.

Treasurer and Superintendent of the Building.

GEORGE W. FOWLE, of Boston.

Secretary and Librarian.

ROBERT MANNING, of Salem.*

Recording Secretary.

ROBERT MANNING, of Salem.

Professor of Botany and Vegetable Physiology.

JOHN ROBINSON, of Salem.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Standing Committees.

Executive.

THE PRESIDENT, FRANCIS B. HAYES, CHAIRMAN.
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Andrews, Frank W.,	Boston.	Blinn, Richard D.,	Chicago, Ill.
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Bliss, B. K., New York.
Bock, William A., N. Cambridge.
Bolles, Matthew, Boston.
Bolles, William P., "
Bolton, John B., Somerville.
Boott, William, Boston.
Bottomly, Robert, Belmont.
Bowditch, E. Francis, Framingham.
Bradlee, John T., Boston.
Breck, Charles H., Brighton.
Breck, Charles H. B., "
Brooks, George, Brookline.
Brown, A. S., Jamaica Plain.
Brown, Atherton T., Boston.
Brown, Benjamin F., Charlestown.
Brown, Jona., Jr., Somerville.
Brown, Joseph T., Boston.
Bullard, George B., Hingham.
Burley, Edward, Beverly.
Burr, Charles C., Newton.
Butler, Edward, Wellesley.

Capen, Aaron D., Mattapan.
Carter, Maria E., Woburn.
Cartwright, James, Wellesley.
Chadbourne, M. W., Watertown.
Chaffin, John C., Newton.
Chapin, Gardner S., Arlington.
Chapin, George H., Watertown.
Chase, Joseph S., Malden.
Cheney, Amos P., South Natick.
Clark, James W., Framingham.
Clark, Joseph, Manchester.
Clark, Joseph W., Dedham.
Cobb, Jonathan H., "
Coe, Henry F., West Roxbury.
Collins, Frank S., Malden.
Comley, James, Lexington.
Cox, James F., Abington.
Crafts, William A., Boston.
Crosby, J. Allen, Jamaica Plain.
Cruickshanks, J. T., Natick.
Curtis, Daniel T., Boston.
Curtis, Joseph H., "

Darling, Moses, Jr., South Boston.
Davenport, A. M., Watertown.
Davis, Frederick, Newton.
Davis, Thomas M., Cambridgeport.
Dean, A. J., Boston.
Demar, John A., Lexington.
Dolbear, Mrs. Alice J., Somerville.
Doogue, William, Boston.
Duffley, Daniel, Brookline.
Dunn, Thomas, Newport, R. I.
Dupee, James A., Brookline.

Eaton, Jacob, Cambridgeport.
Edgar, William, Newtonville.

Falconer, John,	Rochester.
Falconer, William,	Cambridge.
Farrier, Amasa,	Stoneham.
Farrier, Mrs. C.,	"
Faxon, Edwin,	Jamaica Plain.
Felton, Arthur W.,	West Newton.
Fenno, Warren,	Revere.
Fletcher, Edwin,	Acton.
Foster, Joshua T.,	Medford.
Fowle, Charles L.,	Dorchester.
Fowle, George W.,	Jamaica Plain.
French, William E.,	Boston.
Frohock, Roscoe R.,	Malden.
Frost, George,	West Newton.
Frost, Stiles,	Boston.
Gane, Henry A.,	West Newton.
Gardiner, Claudius B.,	Newburyport.
Gardner, John,	Dedham.
Garfield, Charles,	Medford.
Gaut, Samuel N.,	Somerville.
Gilbert, John,	Boston.
Gilbert, Samuel,	"
Gilbert, W. A.,	Neponset.
Gill, Mrs. E. M.,	Medford.
Gleason, Herbert,	Malden.
Godbold, G. A.,	Chelsea.
Goddard, Thomas,	Boston.
Goodwin, Lester,	Brighton.
Gould, William P.,	Jamaica Plain.
Grant, Charles E.,	Boston.
Gray, Howard,	Dorchester.
Gray, William, Jr.,	"
Gray, William, 3d,	"
Greene, Malcolm C.,	"
Grew, Henry,	"
Guerineau, Louis,	Malvern, Ark.
Hall, William T.,	Revere.
Hamlin, Delwin A.,	South Boston.
Harris, Miss Ellen M.,	Jamaica Plain.
Harris, Frederick L.,	South Natick.
Hartwell, Samuel,	Lincoln.
Harwood, George S.,	Newton.
Hatch, Samuel,	Boston.
Hayes, John L.,	Cambridge.
Hayward, George P.,	Hingham.
Hazleton, H. L.,	Boston.
Hersey, Alfred H.,	Hingham.
Hersey, Edmund,	"
Heustis, Warren,	Belmont.
Hews, Albert H.,	No. Cambridge.
Hill, Benjamin D.,	Peabody.
Hill, Miss Katie A.,	Lowell.
Hinckley, Mrs. D. F.,	Chelsea.
Howe, Rufus,	Marlborough.
Ireland, George W.,	Somerville.
Jameson, G. W.,	East Lexington.
Jones, Moses,	Brookline.
Jordan, Samuel,	Yarmouth.
Judkins, Rev. B.,	West Dedham.
Kelley, George B.,	Jamaica Plain.
Kelsey, Fred W.,	Waverly, N. Y.
Kendall, Jonas,	Framingham.
Kennard, Martin P.,	Brookline.
Kenrick, Miss A. C.,	Newton.
Lamprell, Simon,	Marblehead.
Lang, John H. B.,	Dorchester.
Langworthy, I. P.,	Chelsea.
Leavens, E. W.,	Malden.
Lee, Francis H.,	Salem.
Livermore, Miss M.,	Mt. Auburn.
Loring, Charles G.,	Boston.
Loring, John A.,	"
Lothrop, David W.,	West Medford.
Lothrop, H. A.,	Sharon.
Lothrop, Thornton K.,	Boston.
Lowell, John,	Newton.
Marcou, Mrs. J.,	Cambridge.
Markoe, G. F. H.,	Boston.
May, F. W. G.,	Boston.
McDermott, Andrew,	"
McIntosh, A. S.,	"
McLaren, Anthony,	Forest Hills.
Mellen, George M.,	Brookline.
Merrill, J. Warren,	Cambridgeport.
Merrill, S. A.,	Wollaston.
Mills, William,	Somerville.
Minton, Peter J.,	Forest Hills.

Morandi, Francis,	Malden.	Scott, George H.,	Allston.
Morrison, Hugh,	Bay View.	Scudder, Samuel H.,	Cambridge.
Morton, James H.,	Boston.	Shattuck, F. R.,	Boston.
Murray, Daniel D.,	Brookline.	Shedd, Abraham B.,	Lexington.
Muzzey, Rev. A. B.,	Cambridge.	Shedd, Arthur B.,	"
		Sheppard, Edwin,	Lowell.
Nightingale.Crawford,	Dorchester.	Simpson, Michael H.,	Saxonville.
Norton, Michael H.,	Boston,	Snow, Eugene A.,	Melrose.
Norton, Patrick,	"	Southworth, Edward,	Quincy.
Noyes, George N.,	Auburndale.	Spooner, William H.,	Jamaica Plain.
Nugent, James,	Boston.	Sprague, Charles J.,	Boston.
		Squire, John P.,	Arlington.
O'Brien, James,	Jamaica Plain.	Starbird, Louis D.,	Malden.
		Stevenson, Hamilton,	Woburn.
Park, William D.,	Boston.	Stone, Eliphalet,	Dedham.
Parker, John,	"	Stone, Samuel G.,	Charlestown.
Parsons, William,	"	Storer, Charles,	Natick.
Patterson, James,	Cambridge.	Story, Miss Sarah W.,	Brighton.
Payson, Samuel R.,	Boston.	Strahan,Thomas, Jr.,	Chelsea.
Phillips, Nathaniel,	Dorchester.	Sullivan, J L. D.,	Somerville.
Pickering, Mrs. E.C.,	Cambridge.	Swan, Charles W.,	Boston.
Plimpton, W. P.,	West Newton.		
Power, Charles J.,	S. Framingham.	Tailby, Joseph,	Wellesley.
Pratt, Mrs. Mary L.,	Hingham.	Talbot, Josiah W.,	Norwood,
Prince, Thomas,	Boston.	Tapper, Thomas,	Canton.
Putnam, Charles A.,	Salem.	Terwilliger, S. F.,	Saratoga, N. Y.
Putnam, Henry W.,	"	Tobey, Miss M. B.,	Brookline,
		Todd, Jacob,	Boston.
Randall, Macey,	Sharon.	Torrey, Bradford,	"
Ranlett, S. A.,	Melrose.	Trautman, Martin,	"
Richards, John S.,	Brookline.	Turner, Nathaniel W.	"
Richardson, E. P.,	Lawrence.		
Richardson, Horace,	Framingham.	Underwood, Wm. J.,	Belmont.
Ridler, Charles E.,	Kingston.		
Roberts, Edward,	Hyde Park.	Van der Veur, P. W.,	New York.
Rogers, John F.,	Cambridge.	Vaughan, J. C.,	Chicago, Ill.
Ross, Charles W.,	Newtonville.		
Russell, George,	Boston.	Walker, Charles H.,	Chelsea.
		Walker, Joseph T.,	Boston.
Safford, Fred'k M.,	Dorchester.	Walker, William P.,	Somerville.
Safford, Nathaniel F.,	Milton.	Webster, John,	Salem.
Saunders, Miss M.T.,	Salem.	Weld, Francis M.,	Jamaica Plain.
Saville, George,	Quincy.	Wellington, Chas. A.,	E. Lexington.
Sawtell, J. M.,	Fitchburg.	Wellington, Jos. V.,	Cambridge.
Schlegel, Adam,	Boston.	Wells, Benjamin T.,	Boston.
Schmitt, Georg A.,	Brookline.	Weston, Mrs. L. P.,	Danvers.
Scott, A. E.,	Lexington.	Wheatland, Henry,	Salem.

Wheeler, Miss Ann C.,	Cambridgeport.	Wiswall, Henry M.,	Watertown.
Wheildon, Wm. W.,	Concord.	Withington, Henry H.,	Jamaica Plain.
White, Nelson B.,	Norwood.	Wolcott, Mrs. H. L. T.,	Boston.
Whitney, Joel,	Winchester.	Wood, Mrs. Anna D.,	West Newton.
Whiton, Starkes,	Hingham Centre.	Wood, E. W.,	" "
Wilde, Hiram,	Randolph.	Woodford, Jos. H.,	Newton.
Wilmarth, H. D.,	Jamaica Plain.	Woolson, George C.,	Passaic, N. J.
Wilson, B. Osgood,	Watertown.		
Wilson, George W.,	Malden.	Zirngiebel, Denys,	Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXVI. — Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments; and any member having once paid an admission fee, may become a Life Member by the payment of twenty dollars in addition thereto.

SECTION XXVII. — Admission Fee and Annual Assessment.

Every subscription member, before he receives his Diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIX. — Discontinuance of Membership.

Any member who shall neglect for the space of two years to pay his annual assessment, shall cease to be a member of the Society, and the Treasurer shall erase his name from the List of Members.

The attention of Annual Members is particularly called to Section XXIX.

HONORARY MEMBERS.

A * denotes the member deceased. Correspondents of the Society and others will confer a favor by communicating to the Secretary information of the decease, change of residence, etc., of Honorary or Corresponding Members.

*Benjamin Abbott, LL. D., Exeter, N. H.
*John Abbott, Brunswick, Me.
*Hon. John Quincy Adams, LL. D., late President of the United States, Quincy.
*Prof. Louis Agassiz, Cambridge.
*William T. Aiton, late Curator of the Royal Gardens, Kew, England.
*Thomas Allen, Ex-President of the St. Louis Horticultural Society, St. Louis, Mo., and Pittsfield, Mass.
*Hon. Samuel Appleton, Boston.
*Hon. James Arnold, New Bedford.
*Edward Nathaniel Bancroft, M. D., late President of the Horticultural and Agricultural Society of Jamaica.
*Hon. Philip P. Barbour, Virginia.
*Don Angel Calderon de la Barca, late Spanish Minister at Washington.
*Robert Barclay, Bury Hill, Dorking, Surrey, England.
*James Beekman, New York.
*L'Abbe Berlèse, Paris.
*Nicholas Biddle, Philadelphia.
*Dr. Jacob Bigelow, Boston.
*Mrs. Lucy Bigelow, Medford.
*Le Chevalier Soulange Bodin, late Secrétaire Général de la Société d'Horticulture de Paris.
Hon. George S. Boutwell, Groton.
*Josiah Bradlee, Boston.
*Hon. George N. Briggs, Pittsfield.
*Hon. James Buchanan, late President of the United States, Lancaster, Penn.
*Jesse Buel, late President of the Albany Horticultural Society, Albany, N. Y.
*Hon. Edmund Burke, late Commissioner of Patents, Washington, D. C.
*Augustin Pyramus de Candolle, Geneva.
Hon. Horace Capron, Ex-U. S. Commissioner of Agriculture, Washington, D. C.
*Commodore Isaac Chauncey, U. S. Navy, Brooklyn, N. Y.

*Ward Chipman, late Chief Justice of New Brunswick, St. John.
*Lewis Clapier, Philadelphia.
*Hon. Henry Clay, Lexington, Ky.
H. W. S. Cleveland, Chicago, Ill.
*Admiral Sir Isaac Coffin, Bart., England.
*Zaccheus Collins, late President of the Pennsylvania Horticultural Society, Philadelphia.
*Roswell L. Colt, Paterson, N. J.
Caleb Cope, Ex-President of the Pennsylvania Horticultural Society, Philadelphia.
*William Coxe, Burlington, N. J.
*John P. Cushing, Watertown.
*Charles W. Dabney, late U. S. Consul, Fayal, Azores.
*Hon. John Davis, LL. D., Boston.
*Sir Humphry Davy, London.
*Gen. Henry Alexander Scammel Dearborn, Roxbury.
*James Dickson, late Vice-President of the Horticultural Society of London.
*Mrs. Dorothy Dix, Boston.
*Capt. Jesse D. Elliot, U. S. Navy.
*Hon. Stephen Elliot, LL. D., Charleston, S. C.
*Hon. Henry L. Ellsworth, late Commissioner of Patents, Washington, D C.
*Allyn Charles Evanson, late Secretary of the King's County Agricultural Society, St. John, N. B.
*Hon. Edward Everett, LL. D., Boston.
*Hon. Horace Everett, Vermont.
*F. Faldermann, late Curator of the Imperial Botanic Garden, St. Petersburg.
*Hon. Millard Fillmore, late President of the United States, Buffalo, N. Y.
*Dr. F. E. Fischer, late Professor of Botany at the Imperial Botanic Garden, St. Petersburg.
*Hon. Theodore Frelinghuysen, late President of the American Agricultural Society, New Brunswick, New Jersey.
*Joseph Gales, Jr., late Vice-President of the Horticultural Society, Washington, D. C.
*George Gibbs, New York.
*Stephen Girard, Philadelphia.
*Hon. Robert T. Goldsborough, Talbot County, Maryland.
*Ephraim Goodale, South Orrington, Maine.
*Mrs. Rebecca Gore, Waltham.
*Hon. John Greig, late President of the Domestic Horticultural Society, Canandaigua, N. Y.
*Mrs. Mary Griffith, Charlies Hope, N. J.
*Gen. William Henry Harrison, late President of the United States, North Bend, O.
*S. P. Hildreth, M. D., Marietta, O.
*Thomas Hopkirk, late President of the Glasgow Horticultural Society.
*David Hosack, M. D. late President of the New York Horticultural Society.

*Lewis Hunt, Huntsburg, O.
*Joseph R. Ingersoll, late President of the Pennsylvania Horticultural Society, Philadelphia.
*Gen. Andrew Jackson, late President of the United States, Nashville, Tenn.
*Mrs. Martha Johonnot, Salem.
*Jared Potter Kirtland, M. D., LL. D., East Rockport, O.
*Thomas Andrew Knight, late President of the Horticultural Society of London.
*Gen. La Fayette, La Grange, France.
*Le Comte De Lasteyrie, late Vice-President of the Horticultural Society of Paris.
L. A. H. Latour, M. P., Montreal, Canada.
*Baron Justus Liebig, Giessen, Germany.
*Prof. John Lindley, late Secretary of the Horticultural Society of London.
Franklin Litchfield, U. S. Consul at Puerto Cabello, Venezuela.
*Joshua Longstreth, Philadelphia.
*Nicholas Longworth, Cincinnati.
*Jacob Lorillard, late President of the New York Horticultural Society.
*John C. Loudon, London.
*Hon. John A. Lowell, Boston.
*Baron Charles Ferdinand Henry Von Ludwig, late Vice-President of the South African Literary and Scientific Institution, Cape Town, Cape of Good Hope.
*Hon. Theodore Lyman, Brookline.
Col. Theodore Lyman, Brookline.
*Hon. James Madison, late President of the United States, Montpelier, Va.
*Mrs. Charlotte Marryatt, Wimbledon, near London.
Joseph Maxwell, Rio Janeiro.
D. Smith McCauley, U. S. Consul-General, Tripoli.
*Hon. Isaac McKim, late President of the Horticultural Society of Maryland, Baltimore.
Rev. James H. Means, Dorchester, Mass.
*James Mease, M. D., Philadelphia.
*Lewis John Mentens, Brussels, Belgium.
*Hon. Charles F. Mercer, Virginia.
*François André Michaux, Paris.
Donald G. Mitchell, New Haven, Conn.
*Samuel L. Mitchill, M. D., LL. D., New York.
*Hon. James Monroe, late President of the United States, Oak Hill, Va.
*Alfred S. Monson, M. D., late President of the New Haven Horticultural Society, New Haven, Conn.
*Hon. A. N. Morin, Montreal, Canada.
*Théodore Mosselmann, Antwerp, Belgium.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Baron Ottenfels, Austrian Minister to the Ottoman Porte.
John Palmer, Calcutta.

*Hon. Joel Parker, LL. D., Cambridge.
Samuel B. Parsons, Flushing, N. Y.
*Hon. Thomas H. Perkins, Brookline.
*A. Poiteau, late Professor in the Institut Horticole de Fromont.
*Hon. James K. Polk, late President of the United States, Nashville, Tenn.
*John Hare Powel, Powelton, Pa.
*Henry Pratt, Philadelphia.
*William Prince, Flushing, N. Y.
*Rev. George Putnam, D. D., Roxbury.
*Col. Joel Rathbone, late President of the Albany and Rensselaer Horticultural Society, Albany, N. Y.
*Archibald John, Earl of Roseberry, late President of the Caledonian Horticultural Society.
*Joseph Sabine, late Secretary of the Horticultural Society of London.
*Don Ramon de la Sagra, Havana, Cuba.
*Henry Winthrop Sargent, Fishkill, N. Y.
*Sir Walter Scott, Abbotsford, Scotland.
*John Shepherd, late Curator of the Botanic Garden, Liverpool, England.
*John S. Skinner, late Editor of the American Farmer, Baltimore, Md.
George W. Smith, Boston.
*Stephen H. Smith, late President of the Rhode Island Horticultural Society.
*Hon. Charles Sumner, Boston.
*Hon. John Taliaferro, Virginia.
*Gen. James Talmadge, late President of the American Institute, N. Y.
*Gen. Zachary Taylor, late President of the United States, Baton Rouge, La.
*James Thacher, M. D., Plymouth.
John J. Thomas, Union Springs, N. Y.
*James W. Thompson, M. D., Wilmington, Del.
*Grant Thorburn, New York.
*M. Du Petit Thouars, Paris.
*Le Vicomte Hericart de Thury, late President of the Horticultural Society of Paris.
*Mons. Tougard, late President of the Horticultural Society of Rouen, France.
*Gen. Nathan Towson, late President of the Horticultural Society, Washington, D. C.
*Hon. John Tyler, late President of the United States, Williamsburg, Va.
*Rev. Joseph Tyso, Wallingford, England.
*Hon. Martin Van Buren, late President of the United States, Kinderhook, N. Y.
*Federal Vanderburg, M. D., New York.
*Jean Baptiste Van Mons, M. D., Brussels, Belgium.
*Gen. Stephen Van Rensselaer, Albany, N. Y.
*Joseph R. Van Zandt, Albany, N. Y.
*Benjamin Vaughan, M. D., Hallowell, Me.
*Petty Vaughan, London.

*Rev. N. Villeneuve, Montreal, Canada.
*Pierre Phillippe André Vilmorin, Paris.
*James Wadsworth, Geneseo, N. Y.
*Nathaniel Wallich, M. D., late Curator of the Botanic Garden, Calcutta.
*Malthus A. Ward, M. D., late Professor in Franklin College, Athens, Ga.
*Hon. Daniel Webster, Marshfield.
*Hon. John Welles, Boston.
*Jeremiah Wilkinson, Cumberland, R. I.
Hon. Robert C. Winthrop, Boston.
*Frederick Wolcott, Litchfield, Conn.
*Ashton Yates, Liverpool, England.
*Lawrence Young, late President of the Kentucky Horticultural Society, Louisville.

CORRESPONDING MEMBERS.

A * denotes the members deceased.

*John Adlum, Georgetown, D. C.
Don Francisco Aguilar, U. S. Vice-Consul at Maldonado, Banda Oriental del Uruguay.
*Mons. Alfroy, Lieusaint, France.
James T. Allan, Ex-President of the Nebraska State Horticultural Society, Omaha, Neb.
A. B. Allen, New York.
Rev. Thomas D. Anderson, South Boston.
*Thomas Appleton, late U. S. Consul at Leghorn, Italy.
*Col Thomas Aspinwall, late U. S. Consul at London, Brookline.
P. M. Augur, State Pomologist, Middlefield, Conn.
*Isaac Cox Barnet, late U. S. Consul at Paris.
Patrick Barry, Chairman of the General Fruit Committee of the American Pomological Society, Rochester, N. Y.
*Augustine Baumann, Bolwiller, Alsace.
*Eugéne Achille Baumann, Rahway, N. J.
*Joseph Bernard Baumann, Bolwiller, Alsace.
Napoleon Baumann, Bolwiller, Alsace.
D. W. Beadle, St. Catherine's, Ontario.
Prof. W. J. Beal, Lansing, Michigan.
*Noel J. Becar, Brooklyn, N. Y.
*Edward Beck, Worton College, Isleworth, near London.
Rev. Henry Ward Beecher, Peekskill, N. Y.
Louis Édouard Berckmans, Rome, Ga.
Prosper J. Berckmans, Augusta, Ga.
*Alexander Bivort, late Secretary of the Société Van Mons, Fleurus, Belgium.
*Tripet Le Blanc, Paris.
*Charles D. Bragdon, Pulaski, Oswego Co., N. Y.
*William D. Brinckle, M. D., Philadelphia.
*George Brown, late U. S. Commissioner to the Sandwich Islands, Beverly.
*John W. Brown, Fort Gaines, Ga.
Dr. Nehemiah Brush, East Florida.
*Arthur Bryant, Sr., Ex-President of the Illinois State Horticultural Society, Princeton, Ill.
*Robert Buist, Philadelphia.
*Dr. E. W. Bull, Hartford, Conn.
William Bull, Chelsea, England.

Rev. Robert Burnet, Ex-President of the Ontario Fruit Growers' Association, Pictou, N. S.

Alexander Burton, United States Consul at Cadiz, Spain.

Isidor Bush, Bushberg, Jefferson Co., Mo.

George W. Campbell, Delaware, Ohio.

*Francis G. Carnes, New York.

*Col. Robert Carr, Philadelphia.

*Rev. John O. Choules, D. D., Newport, R. I.

*Rev. Henry Colman, Boston.

*James Colvill, Chelsea, England.

Benjamin E. Cotting, M. D., Boston.

*Samuel L. Dana, M. D., Lowell.

*J. Decaisne, Professeur de Culture au Muséum d'Histoire Naturelle, Jardin des Plantes, Paris.

*James Deering, Portland, Me.

*H. F. Dickehut.

*Sir C. Wentworth Dilke, Bart., London.

*Hon. Allen W. Dodge, Hamilton.

Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.

*Andrew Jackson Downing, Newburg, N. Y.

Charles Downing, Newburg, N. Y.

Parker Earle, Cobden, Ill.

*F. R. Elliott, late Secretary of the American Pomological Society, Cleveland, O.

George Ellwanger, Rochester, N. Y.

*George B. Emerson, LL. D., Winthrop.

*Ebenezer Emmons, M. D. Williamstown.

*Andrew H. Ernst, Cincinnati, O.

*Nathaniel Fellows, Cuba.

*Henry J. Finn, Newport, R. I.

*W. C. Flagg, late Secretary of the American Pomological Society, Moro, Ill.

*Michael Floy, late Vice-President of the New York Horticultural Society, New York City.

*John Fox, Washington, D. C.

*Hon. Russell Freeman, Sandwich.

Andrew S. Fuller, Ridgewood, N. J.

Henry Weld Fuller, Roxbury.

Hon. Robert W. Furnas, President of the Nebraska State Horticultural Society, Brownville, Neb.

*Augustin Gande, late President of the Horticultural Society, Department of Sarthe, France.

*Robert H. Gardiner, Gardiner, Me.

*Benjamin Gardner, late U. S. Consul at Palermo, Sicily.

*Capt. James T. Gerry, U. S. Navy.

*Abraham P. Gibson, late U. S. Consul at St. Petersburg.

*R. Glendinning, Chiswick, near London.

Prof. George L. Goodale, Cambridge.
Charles W. Gordon, U. S. Consul at Rio Janeiro.
Prof. Asa Gray, Cambridge.
O. B. Hadwen, Ex-President of the Worcester County Horticultural Society, Worcester.
*Charles Henry Hall, New York.
*Abraham Halsey, late Corresponding Secretary of the New York Horticultural Society, New York.
*Dr. Charles C. Hamilton, late President of the Fruit Growers' Association and International Show Society of Nova Scotia, Canard.
*Rev. Thaddeus Mason Harris, D. D., Dorchester.
*Thaddeus William Harris, M. D., Cambridge.
*John Hay, late Architect of the Caledonian Horticultural Society.
*Bernard Henry, late U. S. Consul at Gibraltar, Philadelphia.
Shirley Hibberd, Editor of the Gardener's Magazine, London.
*J. J. Hitchcock, Baltimore.
Robert Hogg, LL. D., Editor of the Journal of Horticulture, London.
*Thomas Hogg, New York.
Thomas Hogg, New York.
J. C. Holding, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.
Rev. S. Reynolds Hole, Caunton Manor, Newark, Nottinghamshire, England.
Fisher Holmes, Sheffield, England.
Sir Joseph Hooker, K. C. S. I., Director of the Royal Botanic Garden, Kew, England.
Josiah Hoopes, West Chester, Penn.
Prof. E. N. Horsford, Cambridge.
*Sanford Howard, Chicago, Ill.
*Dr. William M. Howsley, late President of the Kansas State Horticultural Society, Leavenworth.
*Isaac Hunter, Baltimore, Md.
*Isaac Hurd, Cincinnati, Ohio.
George Husmann, Professor of Horticulture in the University of the State of Missouri, Columbia.
*Prof. Isaac W. Jackson, Union College, Schenectady, N. Y.
*Thomas P. James, Cambridge.
Edward Jarvis, M. D., Dorchester.
J. W. P. Jenks, Middleborough.
William J. Johnson, M. D., Fort Gaines, Ga.
Samuel Kneeland, M. D., Boston.
*Mons. Laffay, St. Cloud, near Paris, France.
*David Landreth, late Corresponding Secretary of the Pennsylvania Horticultural Society, Bristol, Pa.
C. C. Langdon, Mobile, Alabama.
*Dr. William LeBaron, late State Entomologist, Geneva, Ill.
G. F. B. Leighton, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

*E. S. H. Leonard, M. D., Providence, R. I.
*André Leroy, Author of the Dictionnaire de Pomologie, Angers, France.
J. Linden, Ghent, Belgium.
Hon. George Lunt, Scituate.
*F. W. Macondray, San Francisco, Cal.
*James J. Mapes, LL. D., Newark, N. J.
*A. Mas, late President of the Horticultural Society, Bourg-en-Bresse, France.
Dr. Maxwell T. Masters, Editor of the Gardeners' Chronicle, London.
*James Maury, late U. S. Consul at Liverpool, England.
T. C. Maxwell, Geneva, N. Y.
*William Sharp McLeay, New York.
*James McNab, late Curator of the Botanic Garden, Edinburgh, Scotland.
Thomas Meehan, Editor of the Gardener's Monthly, Germantown, Pa.
*Allan Melvill, New York.
*John Miller, M. D., Secretary of the Horticultural and Agricultural Society of Jamaica.
*Stephen Mills, Flushing, N. Y.
*Charles M'Intosh, Dalkeith Palace, near Edinburgh.
J. E. Mitchell, Philadelphia.
*Giuseppe Monarchini, M. D., Canea, Isle of Candia.
Édouard Morren, Editor of the Belgique Horticole, Liége, Belgium.
*Horatio Newhall, M. D., Galena, Ill.
*David W. Offley, late U. S. Consular Agent, Smyrna, Turkey.
James Ombrosi, U. S. Consul, Florence, Italy.
*John J. Palmer, New York.
*Victor Paquet, Paris.
*John W. Parker, late U. S. Consul at Amsterdam, Holland.
*André Parmentier, Brooklyn, N. Y.
William Paul, Waltham Cross, London, N.
*Sir Joseph Paxton, M. P., Chatsworth, England.
*John L. Payson, late U. S. Consul at Messina, Sicily.
*Com. Matthew C. Perry, U. S. Navy, Charlestown.
*David Porter, late U. S. Chargé d' Affaires at the Ottoman Porte, Constantinople.
*Alfred Stratton Prince, Flushing, N. Y.
*William Robert Prince, Flushing, N. Y.
P. T. Quinn, Newark, N. J.
Rev. Rushton Radclyffe, London, England.
*William Foster Redding, Baltimore, Md.
D. Redmond, Ocean Springs, Miss.
Dr. S. Reynolds, Schenectady, N. Y.
*John H. Richards, M. D., Illinois.
Charles V. Riley, Entomologist to the U. S. Department of Agriculture, Washington, D. C.
*Mons. J. Rinz, Jr., Frankfort-on-the-Main, Germany.
*Thomas Rivers, Sawbridgeworth, Herts, England.
William Robinson, Editor of The Garden, London.
*Dr. J. Smyth Rogers, New York.

*Capt. William S. Rogers, U. S. Navy.
*Bernhard Roeser, M. D., Athens, Greece.
*Thomas Rotch, Philadelphia.
*George R. Russell, Roxbury.
John B. Russell, Newmarket, N. J.
*Rev. John Lewis Russell, Salem.
William Saunders, Department of Agriculture, Washington, D. C.
*William Shaler, late U. S. Consul-General at Havana, Cuba.
*William Shaw, New York.
*Caleb R. Smith, Burlington, N. J.
*Daniel D. Smith, Burlington, N. J.
*Gideon B. Smith, late Editor of the American Farmer, Baltimore, Md.
*John Jay Smith, Germantown, Penn.
*Horatio Sprague, late U. S. Consul at Gibraltar.
Robert W. Starr, Port William, Nova Scotia.
Dr. Joseph Stayman, Leavenworth, Kansas.
*Capt. Thomas Holdup Stevens, U. S. Navy, Middletown, Conn.
William Fox Strangeway, British Secretary of Legation at Naples, Italy.
Dr. J. Strentzel, Martinez, Cal.
*Judge E. B. Strong, Rochester, N. Y.
*James P. Sturgis, Canton, China.
William Summer, Pomaria, S. C.
Francis Summerest.
*Prof. Michele Tenore, late Director of the Botanic Garden at Naples, Italy.
*James Englebert Teschemacher, Boston.
*Robert Thompson, Chiswick, near London.
*George C. Thorburn, New York.
Prof. George Thurber, Editor of the American Agriculturist, New York.
*John Tilson, Jr., Edwardsville, Illinois.
*Cav. Doct. Vincenzo Tineo, Director of the Botanic Garden at Palermo.
*Luther Tucker, Editor of the Cultivator, Albany, N. Y.
*Carey Tyso, Wallingford, England.
*Louis Van Houtte, Ghent, Belgium.
*Alexander Vattemare, Paris.
*Emilien de Wael, late Secretary of the Horticultural Society, Antwerp, Belgium.
John A. Warder, M. D., President of the Ohio State Horticultural Society, North Bend, O.
Anthony Waterer, Knapp Hill, near Woking, Surrey, England.
*J. Ambrose Wight, Editor of the Prairie Farmer, Chicago, Ill.
Benjamin Samuel Williams, Holloway, London, N.
Prof. John Wilson, Edinburgh University, Scotland.
*William Wilson, New York.
*Hon. J. F. Wingate, Bath, Me.
*Gen. Joshua Wingate, Portland, Me.
*Joseph Augustus Winthrop, Charleston, S. C.

A HISTORY

OF

AMERICAN HORTICULTURE.

The attention of Trustees and Librarians of Public Libraries, and of Horticulturists generally, is called to the History of the Massachusetts Horticultural Society, for fifty years, from its foundation in 1829. This work will be found of general interest, as the introduction comprises a sketch, much fuller than exists elsewhere, of the History of Horticulture in the United States, from the settlement of the country to the foundation of the Society, and the history of the Society onward is, in the language of President Hovey, in his address at the dedication of the present Hall of the Society, "the History of Horticulture in our country." It is handsomely printed, on an extra quality of paper, and embellished with a fine steel engraving of Gen. H. A. S. Dearborn, the first President, and heliotypes of the two Halls erected by the Society. Among other interesting matters, it contains an account of the foundation by the Society of Mount Auburn Cemetery, the parent of all similar cemeteries in the country.

The work is furnished to members of the Society, at cost, $2.50, and to others, than members, for $3, but will be supplied to public libraries and booksellers at the same price as to members. Please address the Secretary of the Society, at Horticultural Hall, Boston.

ROBERT MANNING,

Secretary.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1883.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1883.

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The following papers aud discussions have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the Boston Transcript. As here presented, the papers are printed in full, and the discussions are not only fuller than in the weekly reports, but have been carefully revised by the speakers.

The Committee on Publication and Discussion take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

BENJAMIN G. SMITH,
JOHN B. MOORE,
WILLIAM H. HUNT,
} *Committee on Publication and Discussion.*

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 6, 1883.

A duly notified stated meeting was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Recording Secretary being absent, owing to illness, E. W. Wood was chosen Recording Secretary *pro tem.*

The President delivered his annual address, as follows:

ADDRESS OF PRESIDENT HAYES.

Ladies and Gentlemen of the Massachusetts Horticultural Society:

To this temple, dedicated to the science and art of Horticulture, we have come this morning to renew our vows of devotion to the loved duties and pleasures associated with the place; to reciprocate kindly greetings of the new year; to cheer and stimulate each other in our work; and while grateful to Divine Providence for what has been accomplished by our institution in the past, to resolve that in the future we will do more than heretofore, according to the strength and means afforded us, to fulfil the beneficent mission of our organization.

We have great cause for thankfulness that able and wise men in past years established this Society, and that by their efforts, and those of their associates and successors, so much has been done for the improvement and profit of the community. It is very

pleasant to think that the benefits of this Society have not been limited by state lines or national boundaries, but that all the world has to some extent participated with us in the advantages resulting from the establishment of our institution. While we rejoice that so much has been done for the general good, by this Society since its origin, we should be animated by the desire to do more and more every year, as our knowledge and ability increase, that future generations may, by our example, be incited to take up the work when their predecessors are obliged to lay it down, and with loving diligence prosecute it to the glory of the Creator and the good of mankind.

Since our last annual meeting, I am happy to report good progress in the Society's work. Our exhibitions have been beautiful, instructive, and successful. The essays and discussions, which have been listened to by large audiences at our meetings with great satisfaction, have been able and interesting. Never before have our meetings been so well attended as the past year, thereby manifesting an increased interest of our members and the community at large, in horticultural subjects. The publication of our TRANSACTIONS has elicited the commendation of sister societies, and of many others in different parts of the world. Our library is in a better condition than it ever was before; its treasures are rapidly increasing, and, under the present excellent management, its usefulness has been much augmented. During the past year, our librarian, with the assistance furnished him, has made considerable progress in cataloguing the valuable prints in our possession, and this work will be prosecuted during the present year. Additional bookcases, and other conveniences for the library room have been provided, and rules for its use adopted, so that now it has become a favorite resort for our members, and others interested in horticultural studies.

I am happy to report an improvement in our financial condition during the past year. We have received a flattering increase in the rental of our halls over the previous year, proving the wisdom of the Society in making the improvements in our building in 1881. The Treasurer's accounts, when presented, will show that we have now about four thousand dollars more of cash on hand than we had on our last anniversary. Besides this, the returns from Mount Auburn Cemetery, not yet officially communicated to us, will exhibit an increase of revenue coming to this Society of about seven hundred dollars above the sum returned a year ago.

Though gratified with this report of increase of our income, we must bear in mind that we cannot depend upon this increase being permanent, and, moreover, if we make the contemplated improvements of our building, we shall lose during the progress of the work the rentals of our stores, and shall need this surplus to supply probable deficiencies.

We are greatly in want of means to accomplish the important objects of the Society's formation. We require more money than we have, to stimulate growers of flowers, fruits, and specialties. More and larger premiums should be offered for excellence in these departments. Liberal premiums should be given for improvements in the culture of land, for the destruction of enemies to vegetation, for remedies for diseases in plants, and for discoveries of new and valuable productions. Larger pecuniary inducements than we now can afford should be offered for procuring the best essays upon horticultural subjects and for their publication.

We have now excellent halls for our exhibitions, a good library room which is capable of enlargement for receiving our books; convenient rooms are provided for the transaction of the business of the Society's officers, and now we must improve the condition of the lower portion of our building, better adapting it to the wants of business, if possible, that we may increase our rentals and at the same time add to the beauty of the structure. For some months during the past year, as we did not wish to renew the expiring leases of our stores, contemplating alterations of them, we have been obliged to rent them temporarily to those who would give us the largest rent. As it is desirable to procure as soon as possible the best class of tenants, and adapt our building to their wants, the committee having the subject in charge have deemed it judicious to advertise the Society's willingness to alter the first story and basement of our building if it were desired, and to ask proposals from parties wishing to hire the stores. The committee have thought, if from the answers to their advertisement, it seemed alterations of the building would result in such an increase of our income as to justify the expenditure necessary to make the improvements, that then they would turn their attention to providing the means required to accomplish the object without burthening the Society. Already some subscriptions for the purpose have been obtained, and I am certain you will cordially coöperate in improving our estate so as to give the Society additional revenue which is much needed to meet its increasing wants.

The advantage of offering valuable prizes for specialties in horticulture was illustrated again in our Rose Show of last summer. Though generally this beautiful plant had suffered much from the severe early frost in the preceding month of October; yet by great care and labor, exhibitors showed very fine specimens of many varieties, which deservedly received the rewards of the Society and commanded the admiration of the public.

The Chrysanthemum Exhibition was perhaps the most remarkable one ever made in this country of this flower. All were charmed with it, so wonderful was the variety of color and form of the specimens shown, and the beauty of this exhibition, redounding so much to the credit of the exhibitors, will never be forgotten by those who witnessed it.

Observing the good resulting from offering special prizes, I am impressed with the great benefit which would result if we had the means of offering larger and more attractive prizes for many different specialties of horticulture.

It gives me great pleasure to bear witness to the valuable services rendered by all the committees during the past year, by which the dignity and high character of the Society has not only been upheld, but increased. We are, also, much indebted to the Treasurer and Secretary for the intelligent and faithful manner with which they have discharged their respective duties.

Ladies and Gentlemen: Bound together by a common love of nature, we have met, week after week, and month after month, to see the beautiful and useful products of the earth, to discuss their properties and peculiarities, their manner of growth and habit, and to receive and give information upon various horticultural subjects. Such association is not only pleasant, but necessarily profitable to us. We come to know each other better by acquaintance, and though at times we may differ as to the manner of best prosecuting our work; yet we have learned little if we have not learned that by sincere and earnest devotion to our work our views are enlarged, and we are more ready to give credit to our fellow laborers for intelligence and ability, seeing how difficult it is for man to probe the secrets of nature, and that, not infrequently, most valuable discoveries are made through the humblest instruments. By coming together, and learning the experience of many, each of us makes far more rapid advance in our loved pursuit than can be made by the individual, solitary labor of any one. Finding how

much this association benefits us, it is plainly our duty to transmit to our successors, not only unimpaired, but augmented, the means of improvement which we have enjoyed.

In this spirit, we will cultivate more diligently than we have hitherto done, all those kindly offices to each other which give pleasure to social intercourse. We will, disinterestedly, and with a sacred regard to truth and principle, conduct ourselves in the performance of our duties and relations to each other, in accord with the purity of purpose and loftiness of character of our predecessors who founded and established this Society; and, with the blessing of Providence, we will maintain and enlarge its usefulness, doing our part in our day for that noble object, that its benign influence may be perpetuated and transmitted to future generations.

Hon. Marshall P. Wilder moved a vote of thanks to the President for his able and interesting address, which was passed unanimously.

John B. Moore moved that one hundred dollars be appropriated for floral exhibitions at the winter meetings, to be spent at the discretion of the Flower Committee. The motion was carried.

The Committee of Arrangements asked further time to report, which was granted. It was also voted to give the Treasurer further time to prepare his report.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

T. Otis Fuller, of Needham.
James Hewins, of Medfield.
John Lane, of East Bridgewater.
C. L. Allen, of Garden City, N. Y.
Frederick Goddard May, of Dorchester.

Adjourned to Saturday, January 13.

MEETING FOR DISCUSSION.

WHAT IS THE BEST METHOD OF REPELLING OR DESTROYING THE INSECT ENEMIES OF FRUITS AND FRUIT TREES, ESPECIALLY THE CODLING MOTH? IS TRAPPING A PROVED SUCCESS? WHAT ARE THE RESULTS OF EXPERIMENTS WITH PARIS GREEN, OR ANY OTHER POISONOUS APPLICATION?

By JACOB W. MANNING, Reading.

Few fruit trees or plants can be found that do not suffer in some way from insect enemies. The fruit, also, of almost every useful tree or plant is more or less defiled or injured so as to be lessened in value, or ruined for the use of man, as well as for domestic animals in many cases.

One injurious insect after another comes on, covering much or all of the season of growth and development of fruit, and even extending through the season of the preservation of the fruit,—all this to the dismay of the fruit grower; so that it may well be said that the man who carries to market fine specimens of fruit is to be compared to a warrior in an enemy's country, who has succeeded by strategy and great labor and bravery, in gathering spoils; he is not always sure of securing more, for the enemy may come upon him. He is often in fear lest the numerous insect tribes will destroy all his most reasonable hopes before he can find a market for his crop after it is grown.

The army-worm and the grasshopper have often destroyed all fruit, cereal, and forage crops in sight of a given point in a few hours, and man must stand by helpless; but such serious and almost uncontrollable disasters happen only occasionally.

The canker-worm in a few days has destroyed all hope of fruit on the apple tree, and if this pest is not arrested, after a few years the life of the trees, annually denuded of their foliage in their most active season of growth, is to be despaired of.

The most effectual remedy we yet know of for the extermination of the canker-worm is "London Purple" or "Paris Green"; the first is preferable, I think, because, on account of its lightness and its finer division, it will remain suspended in the water, and does not require the constant agitation necessary with the Paris

green and water. The London purple has, also, a more prominent color, and can be seen more readily on the leaf.

The proper proportion is best found out by experiment; if it is too strong, it will kill the leaves; if it is too weak, it will not kill the worms. I have found that a heaping teaspoonful to a three-gallon pail of water was about right, or, on a large scale, about a pound to two hundred gallons of water.

It should be applied in a fine spray, either by a common garden syringe or by a portable pump and hose attachment. A supply of the poisoned water, with pump and attachment, may be moved in a wagon from tree to tree, and field to field. All the foliage should be sprinkled as far as possible. It is sometimes necessary to go over the trees two or three times to kill all the worms, but we have repeatedly seen cases where one application served to clear out the pest, and not a worm was seen again for years. This was the case in Amos Hill's orchard in Belmont, in 1878; also in 1880, in my own nursery, where thousands of apple and elm trees, in nursery rows, were cleared of the pest by one application. This was made when the worms were nearly mature; there were some trees in the grounds that escaped the poison, and it was supposed there were enough worms left to spread over the grounds the next year; but much to our satisfaction they have not been seen since. The only explanation I can give is, that the birds destroyed what were left after we had killed the greater part.

The time to apply the poison is, I think, as soon as the slightest perforation of the leaf can be seen, but it was effectual in my case when the worms were nearly grown.

I find that the foliage of the cherry, plum, three-thorned acacia, and linden are all more or less eaten by the canker-worm.

It is impossible to reach tall elms with the syringe, and on such trees the printer's ink on a band of paper, or a metallic collar filled with oil, would be successful; or a box set around the base of the tree, with a trough for oil around the top, as was practised in Messrs. Clapp's orchard in Dorchester nearly forty-five years ago. The first set of boxes lasted twenty years; the second set remains still. The boxes cost about thirty-three cents each.

Some maintain that it is best not to battle the canker-worms at all, because that in from five to seven years they will run their course and disappear; while, on the other hand, I am credibly informed that about Dorchester the canker-worm has never failed

to appear in some parts of the town every year for more than fifty years.

The fact that the methods mentioned are effectual, affords one ray of hope for the tree and fruit grower. It would be of lasting benefit if one general application could be made to all sorts of trees infested with the canker-worm, as far as they extend,—for it does not appear to infest all sections alike. It is a strange thing, but yet a fact, that it was not known to reach beyond a certain division wall in one direction, yet ate all before it up to this wall at different intervals within the last hundred years. This instance is related by Mr. Hyde, of Newton. This pest is not of sufficient moment, however, to deter a courageous and vigilant man from planting orchards.

The orchard of our fellow member, T. C. Thurlow, of West Newbury, was devastated for years by the canker-worm, so that little fruit was obtained. By the use of printer's ink, involving an expense of four and one-half cents per tree, a reward followed, the next year, in a crop of nine hundred barrels of number one Baldwins, seven hundred barrels the next year, and fourteen hundred barrels the next year. Thus it seems the trees were determined to make up lost time when once relieved of the enemy that had preyed upon them.

The lesson seems to be, to plant trees and take care of them, and the canker-worm also. The fruit will increase, and the worms decrease, by as intelligent management as is necessary to conduct any business successfully.

The codling-moth is one of the most insidious of our insect foes. Coming, as it ordinarily does, in the moth state at the blossoming of the apple, the same amount of warmth that helps to bring out the apple blossoms also helps to bring out the codling-moth from its winter form in the cocoon. It then lays an egg in the blossom end or eye of the apple, and the worm coming from this eats its way into the apple, causing many to drop prematurely, and defiling many others that do not drop. The worm then comes from the apple and finds its way to crevices in the bark of the tree, or similar protection near by, where it spins for itself a cocoon and prepares for its transformation to a butterfly in the spring. Thus the round of life rolls on for this insect. Man has been obliged to study the life and habits of the insects to find a remedy for the injury they do him. He has found that they go

through certain stages in a season, and all these at his expense for the benefit of their posterity; and thus from year to year they struggle on for life, like all other forms of animal and vegetable life. All appear to be pleasing themselves, but they live really for the perpetuation of their several species. But all apple growers are interested in the prevention of the codling-moth and its progeny, from eating his apples and pears.

We can mention no new remedy, but we must rely on the old means of defence, which would be made more effective by a combined union of forces, so that one man who is trying to rid his own grounds may not be beset on all sides by the unchecked insect enemies of his neighbor, obliging him to keep up the same efforts year after year. We have plenty of examples showing that the continued and systematic application of the old remedies is sufficiently successful to warrant its continuance; and if it is not done, the fruit grower will be outdone.

Gathering and destroying all fallen and worm-eaten apples is one of the first requirements. Swine or sheep running at large in an orchard greatly aid in picking up all wormy apples and in keeping the ground well worked and fertilized, and free from grass. The result of the work of swine in the orchard of Col. E. C. Shirley, in Goffstown, N. H., who communicated with this Society some years ago, was a more vigorous growth of the trees, and a large crop of Baldwins on the odd year, that were very free from worms, and large, fair, and handsome. His orchard is on high land, with a clayey gravel subsoil. His neighbors' apple crops, on the same soil, without this swine culture, were poor, and the fruit wormy.

Trapping is undoubtedly a help in reducing the number of worms so far as they resort to the traps, whether these are straw bands around the trees, or woollen rags or any other substance that affords them a place to transform from the larva to the cocoon state; and it appears to me that a supply of hot water, made transportable, would be a good thing to immerse these shelters in, rather than to destroy the worms by pounding or hand picking, as is usually done. All dead bark should be scraped off the trees to reduce the number of places where the worms can find shelter.

Open fires at night in the garden and orchard are within the means of all, and serve to destroy a great number of winged insects, including the codling-moth, and it would be well to have

fires in all lands contiguous to the orchard, and especially near woods, if there are any in the locality, as many insects that are destructive in the garden, as well as to the forest trees, no doubt make this a refuge. A lantern over a tub of water is one of the most useful traps to attract and drown insects, and a coating of oil on the water would help to destroy them.

The reason why these simple and effectual remedies are not more often applied is, that the gardener or farmer and his assistants, are all tired when night comes. Undoubtedly it would be a paying investment to hire a man for this work of destroying insects alone.

Charles Downing mentions the following as an effectual trap for all sorts of insects in the garden. Fill wide-mouthed bottles half full of a mixture of water, vinegar, and molasses, and suspend them among the trees. In a short time they will be full of insects and must then be emptied and the liquid renewed. An acquaintance of his captured, in this way, more than three bushels of insects in his garden in a season, and preserved it almost entirely free from their ravages.

I have not given any new method of destroying the codling-moth, but still think the old methods would be completely successful if used systematically by all. Partial application of remedies, as has been the past record of warfare against insects, is comparable to a vacuum in air or water, produced by a pressure brought to bear at some special point; as soon as the resistance is taken away the vacant space at once closes up, and no trace is left.

The borer, which is sometimes a serious pest in our young apple trees, can be easily destroyed by cutting away the bark where their chips show, if taken in hand from July to September. Later, when they are deeper in the wood, a flexible wire pushed into the hole will kill them. But better than either is preventing them from getting into the tree, by a strip of tarred paper around the base of the tree, the bottom covered with soil, and the top tied close around the trunk, six or eight inches up. I applied this remedy successfully nearly thirty years ago. A strong solution of soap is also useful to wash the base of the tree to prevent the eggs being laid. It should be applied at intervals from the first of June until August.

The scale louse can be destroyed by an application of raw linseed oil. Crude petroleum is also used effectually, but it must be diluted with water; this can be done by first mixing it with milk, and then diluting with water.

Pear and cherry tree slugs can be destroyed by a dusting with air-slacked lime or plaster of Paris. A sprinkling of dry dust causes them to fall off the tree, and very few are able to return. A spray of London purple and water can be relied upon to destroy them, as it is fatal to all animal life.

There is no better remedy for plant lice than tobacco water.

Tent caterpillars can be easily destroyed by hand picking or the spiral brush, when the worms are in their webs, on a cool day or early in the morning. They can also be prevented by picking their eggs, which are found in glazed masses surrounding the twigs, and burning them. For the last six or more years we, and all in our vicinity, have been almost entirely free from the ravages of the tent caterpillar. I am confident that they were destroyed by a misty rain that congealed and covered every part of the trees with a coating of ice near the hatching season, thus destroying them. Further inland, where the storm was snow instead of rain, they were never more destructive than that same spring, when they disappeared from us.

The system most in use among plum growers for destroying the curculio is to jar off the insects by a sharp blow of a mallet on a limb sawed off for the purpose. Sheets are arranged around the trees, in which the insects are caught, collected, and destroyed. It is quite important, also, to jar all trees where the insects may lodge, in the vicinity of the plum trees. Many have of late planted these trees in hen yards, and it is found that the hens destroy the insects, and cultivate and fertilize the trees, and thus good crops are secured by the plum cultivator, and he may rely upon one every season. This fact is so fully appreciated that the sale of plum trees has greatly increased.

As the subject of currants and other small fruits is to be taken up in a future discussion, I will not refer to them in this paper.

In closing, I would suggest that any effective or new methods of insect destruction that are observed, from time to time, by friends of the Society, be reported at our meetings.

Discussion.

Hon. Marshall P. Wilder said that he who will not take care of his trees, and prevent the ravages of the canker-worm, deserves to have them eaten up. The curculio can be overcome by jarring

the trees suddenly, and destroying the insects that drop; shaking will not do.

Benjamin P. Ware would use the residuum from kerosene oil works, in preference to printers' ink, for destroying canker-worms, as it does not dry so quickly, and it is very much cheaper. Printers' ink should be renewed at least once in three days, but the substance recommended will last at least twice as long.

James P. King had had much experience with the canker-worm, and had tried printers' ink with no avail, but by the application of the residuum of kerosene he destroyed them entirely.

Edmund Hersey thought there is a second brood of codling-moths. In regard to the canker-worm, he thought that if hens were kept in the orchard there would be no trouble from them. He recommended the same remedy for the curculio.

William C. Strong thought the rose-bug is becoming one of the most formidable enemies of plant growers.

Avery P. Slade had had some experience with the rose-bug, and had formerly fought them by hand picking, but latterly had used kerosene in a wash-pan, jarring the insects into it with a small stick.

William H. Hunt had used the method mentioned by Mr. Slade, to destroy rose-bugs. He thought they leave all other grapes for the Clinton, and that if a row of this variety were planted around the vineyard it would protect the vines within.

Mr. Strong thought the *Spiræa sorbifolia* a better trap than the Clinton grape. They can be easily destroyed when on the flowers.

N. B. White thought the rose-bug was destined to become the worst enemy of the fruit grower.

Hon. James J. H. Gregory had an orchard destroyed by using fish oil to kill canker-worms.

Mr. Wilder closed the discussion by recommending caution in the use of oil on trees.

Notice was given that on the next Saturday, Dr. H. P. Walcott would read a paper on "Chrysanthemums and their Culture."

BUSINESS MEETING.

SATURDAY, January 13, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Secretary read a letter from Winthrop Sargent, of Fishkill-on-the-Hudson, N. Y., acknowledging, in behalf of the family, the resolutions passed by the Society in memory of his father, the late Henry Winthrop Sargent, and thanking the Society therefor. The letter was ordered to be placed on file.

Adjourned to Saturday, January 20.

MEETING FOR DISCUSSION.

CHRYSANTHEMUMS AND THEIR CULTURE.

By Dr. HENRY P. WALCOTT, Cambridge.

The Chrysanthemum family is not only a very large one, but has a distribution over the four quarters of the globe. Only two species, however, are to be the subject of my remarks today, and these two seem only to have been satisfactorily determined by Sabine in 1823. They are the *Chrysanthemum Indicum* (small) of Linnæus, and the *Chrysanthemum Sinense* (large) of Sabine.

The first named, a small, yellow variety, which was growing in the grounds of the Apothecaries' Botanical Garden at Chelsea, in 1764, appears to have attracted very little notice, and in a few years was lost. This was, no doubt, the type, the varieties of which are known now as Pompon and Liliputian. It was figured as a small, branching plant, eighteen inches high. Beyond Thunberg's mention of the chrysanthemum in the "Flora Japonica" in 1784, nothing more is heard of the plant until 1789, when Blancard, a merchant of Marseilles, imported thirty varieties from China, white, purple, and violet, only one of which, the purple, reached France alive. A year later, this purple variety made its way to England, and was the first large flowering chrysanthemum known in that country. In 1795, it bloomed in Mr. Colvill's nursery, and was pictured in the Botanical Magazine, and seems

to have attracted so much notice that several importations of the plant were made; notably by Sir Abraham Hume and Mr. Reeves. Up to the year 1820, the number of varieties had only increased to twelve. In 1865, according to Mr. Salter, the number was over six hundred.

In 1846, Mr. Fortune brought from China two small flowering varieties known as the Chusan Daisy and *Chrysanthemum minimum*, the last the *Chrysanthemum Indicum* of the Chelsea Garden. They would, perhaps, have shared the fate of their predecessor in England, but were, fortunately, carried to France, where the variety immediately became a great favorite, and, as such, has continued the more popular species to this time. From them came all the Pompons now in cultivation.

In 1862, Mr. Fortune introduced several Japanese varieties, some spotted and striped, others of fantastic forms called dragons,—*laciniatum*—still grown. From this latter date to the present time, the progress of cultivation and improvement has been rapid and decisive.

The origin of the different forms of the flowers lies mainly in the changes undergone by the corollas of the disk- or eye-florets. In the wild form, the ray-florets have strap shaped corollas, and the disk-florets regularly five toothed tubular ones. The principal changes in the florets of the disk are

1. To strap shaped becoming flat from base to tip, and these either incurved or reflexed.
2. These may be rolled longitudinally either inwards or outwards.
3. Loose or spreading, attenuated or bifurcated.
4. As above, but with laciniated petals.

The subsequent changes retain the tubular corolla,

5. And this short with enlarged teeth (Anemone).
6. Teeth much enlarged (Dragon).
7. Tube much enlarged, teeth indistinct (Quilled).
8. Quilled but open at the mouth, and spoon shaped, a section represented by the Emperor of China.

Seed was first saved in France in 1830, by M. Bernet, at that time, and for many subsequent years, the most successful grower of the country. Of his early seedlings, the two remarkable reflexed flowers, Christine and Chev. Domage, are still grown. He was succeeded by Bonamy, Pelé, and Lebois, who added many fine

varieties, especially Pompons. Seed has been saved by a few growers in England, but I cannot ascertain that anything has been done in this way of late years, though it should always be a spur to the raising of seedlings, even under great difficulties, to know that the variety Prince of Wales is of English origin.

In 1836, an amateur, in Jersey, took up the chrysanthemum, and raised a large number of very fine seedlings, which were sold to Mr. Chandler. These were of the Large Flowered class, and they immediately secured much favor at the English exhibitions. They were more incurved, and of purer colors, than anything previously seen. In 1843, Mr. Salter began the raising of seedling chrysanthemums at his nursery in Versailles, and in 1847 exhibited the Queen of England, still regarded by many as the finest chrysanthemum extant.

In this brief sketch of the history of the chrysanthemum from the year 1764, we may note its development from the ragged, semi-double flower, to that with broader and more compact florets; and this, again, to the reflexed ranuculus form, ending at last in a perfect symmetrical incurved flower, like Prince Alfred. But there is still room for improvement — possibly not in form, but certainly in size and color.

The cultivation of the chrysanthemum begins with the treatment of the flowering plant. This should be at once cut to the level of the ground, at the end of its flowering season. It is necessary that the shoots, which are promptly made from the neck of the plants, should be grown with thorough exposure to light and air. One of the secrets of a good plant in November, is a strong, well colored cutting in March. With the exception of a few late flowering varieties, like Grandiflora, Purple King, and Virginale, the best season for propagation is March. The cuttings should be from three to four inches long, and my habit is to pot them separately, in two and a half inch pots.

They should not be subjected to bottom heat during their root formation, but when this process is fairly completed they should be shifted to five-inch pots. For this potting the soil should be one-half good loam, one-quarter leaf mould, and one-quarter well rotted stable manure. When the plant has reached a growth of from nine to ten inches, I pinch down to four buds, without exception. The young plants should be given a place in a cold frame as soon as possible, and in the third week in May planted

in the open ground in a thoroughly exposed location, and at a distance apart of not less than three feet.

The subsequent care consists in keeping the ground moist and watching carefully for the first serious appearance of mildew, which, in my own garden, almost invariably first appears between the 16th and 31st of August. My final potting is finished by the 12th of September, and the plants are kept in the open air in a sheltered situation until the first severe frost; they then receive the shelter of a cold house. The final potting is made with soil composed of equal portions of rotted sod and stable manure, and, until the buds are on the point of expanding, the plants receive frequent waterings with some strong liquid manure or a solution of some artificial fertilizer.

While I think a much more attractive general show is made by our habit of exhibiting plants covered with an abundance of flowers, there is, also, as little doubt in my mind that the only way in which to secure flowers of the best quality is that pursued by the English growers, which it may be of interest to describe. It must be remembered that incurved flowers only are shown at the great London shows for cut flowers, those with reflexed petals not being admitted, except to separate and distinct classes. Though this rule may appear to be an arbitrary one, it ensures a more agreeable and harmonious impression in small collections.

The largest and most perfect blooms are had from maiden plants; that is, from suckers or cuttings of the year, and not from parts of the old root, inasmuch as the young plant can be kept constantly growing — a vital point, — whereas, the older plant soon becomes exhausted, and fails to give a continuous growth. In the earlier stages of growth, the same soil and treatment as have been directed for the specimen plant are necessary here, except that with these the leader must never be pinched in, but must be allowed its natural growth in order to concentrate the whole vigor of the plant in its main stem. If planted out — which is, undoubtedly, the best practice here — they should be potted by the middle of August, and well staked, removing all laterals as soon as they appear. Before their potting the crown will probably have thrown out two or three leaders, which must not be removed. Constant watering and syringing are necessary from this time on, to remove insects and keep the foliage bright. In September, buds will appear at the ends of the branches; the largest and best

formed of these — generally, but not invariably, the centre one — should be kept; the rest removed at once, without injury to the remaining bud. You will thus have three buds, and, probably, in due season, three remarkable flowers.

The principal disease of the chrysanthemum is the mildew above mentioned. The only remedy is sulphur, thoroughly applied, either in powder or the compound, with quicklime, in water, called Water of Grison. It is made as follows: one pound of sulphur, one pound of quicklime and three quarts of water, are boiled ten minutes in an iron pot. It should stand until it has settled, when the top should be poured off and bottled, and, when used, diluted with one hundred parts of water.

The insect enemies are, first, the green aphis throughout the season; late in the season the black aphis, and all the grasshoppers. In the last year I have lost a number of plants by some root louse, which I have not yet been able to identify. The aphides are to be dealt with by tobacco. The grasshoppers must be picked by hand, and the root louse is still master of the situation.

With regard to the formation of the plant, this is effected by pinching in, and all varieties, so far as growth goes, stand it. To obtain perfection of flower, however, I am satisfied that the Japanese varieties should not be pinched more than once, or the Large Flowered kinds more than twice. The Pompons, on the contrary, may be pinched with safety to any extent, and as late as the middle of August.

As to varieties, what I have to say is the result of my experience in my own garden, the soil of which is a thin, dry, sandy loam, overlying a coarse gravel. The Japanese kinds which have succeeded best with me are the following.

Grandiflora.—Very large, yellow, but rarely in bloom before the 15th of November.

Bouquet Fait.—Rose mixed with white, centre yellow.

Ceres.—Very large; well described by Bernard, producer of it, as of the color of the rose Souvenir de la Malmaison.

Dr. Masters.—Long red florets, tipped and spotted yellow, with yellow centre; late.

Elaine.—Pure white; broad petals; full.

Fair Maid of Guernsey.—Pure white; long, ribbon-like petals.

Fulton.—Rich yellow.

La Charmeuse.—Early; rich purple, tipped white.

M. Délaux.—Very large; full; reddish crimson, reverse yellow.

Purple King.—Deep purple; late.

The Cossack.—Maroon and yellow.

Parasol.—Petals incurved; chamois colored, edged with gold.

Large Flowered Varieties.—The following is a selection of the best kinds, both for cut blooms and specimens. Many kinds cannot, under any circumstances, be grown for specimen plants—Crimson Velvet, for instance.

The recommendations of the English growers cannot be trusted in this climate. The two most reliable varieties in England appear to be Mrs. George Rundle, pure white; and its yellow sport, George Glenny; but though occasionally succeeding here, I do not think a specimen plant can be had oftener than one year in every five. Mr. Clark once exhibited a very fine specimen.

Guernsey Nugget.—Primrose yellow. It can be recommended for its short-jointed growth and general vigor.

Prince of Wales.—Purplish red; one of the best growers and bloomers.

Mr. Brunlees.—Red, tipped with gold; also very good.

Jardin des Plantes.—Intense bright yellow; unique in color, though not a very good grower.

Venus.—Lilac peach.

Dr. Sharp.—Crimson red.

Mrs. Haliburton.—Creamy white.

Annie Salter.—Soft yellow.

Souvenir de Mercedes.—Preëminent in all good qualities except size.

Orange A. Salter.—A good old kind for compact specimen plants.

Of plants that occasionally furnish a good growth, and, with proper care, always a good flower, are the following.

Prince Alfred.—Rosy red; one of the best blooms in existence.

Princess Teck.—A very large white kind, and

Hero of Stoke Newington, the pink sport from it.

Pink Perfection; Synonym, Mrs. Mary Morgan.—Rich rose; a very handsome flower, and the plant possesses good foliage.

Julia Lagravère, velvety red, and

Procne, very bright amaranth, are indispensable in a collection on account of colors, though not good growers.

Felicity.—A cream-colored flower; good both as a specimen and for cut flowers.

Pompons. *La Vogue.*—Bright yellow with red tips; when opening, it is one of the best.

President.—Reddish rose.

Mr. Astie.—Anemone yellow.

Mdlle. Marthe.—Pure white, and the magnificent golden sport from it,

Golden Mdlle. Marthe.

Salamon.—Cherry red.

Marie Stuart.—Anemone; lilac blush, with light yellow centre.

Eleonore.—Crimson, tipped with gold.

Fanny.—Maroon red.

Rosinante.—Silvery rose, tipped with gold.

Lucrece.—Bronze yellow, delicately fringed.

Although the chrysanthemum is essentially a plant requiring protection to ensure its flowering, a number of varieties have been obtained that will not only flower in September and October, but some even as early as July; and the number of these has, by the efforts of the French growers, much increased in the last few years. The list contains representatives of all these varieties. The earliest flowering are:

Mme. Bachoux.—Lilac.

Petite Marie.—White.

Indicum nanum.—Yellow.

Precocité.—White.

Le Luxembourg.—Dull red.

Bois Duval.

A later flowering section from which I generally obtain flowers in the open air, furnishes of Japanese,

Gloire Rayonnante.—Clear and satiny rose.

Mme. Ch. Desgranges.—White.

Pompons and Large Flowers. *Adonis.*—Cream white, bordered with pink.

Aureole.—Bronze yellow; large flowered.

Capt. Nemo.—Reddish purple, tipped with white.

La Neige.—Pure white.

Dr. Walcott stated that he had had in his collection, first and last, between five and six hundred varieties.

DISCUSSION.

E. W. Wood, who was called on by the President, said that Dr. Walcott had entirely covered the ground, and that any one who followed his directions would be able to bring in exhibition plants. The varieties have increased largely, but more dark, bright colors are wanted. The chrysanthemum has great advantages as a house plant. Ladies desire plants for winter blooming, and run to roses, but it is difficult to cultivate them in the house under the most favorable conditions, and almost impossible under ordinary circumstances. Chrysanthemums may be grown in dwelling houses in all their glory by keeping them in a cool room. The black aphis is as easily destroyed as the green, by removing the plants to a room where they can be fumigated with tobacco. The plants should be kept out-doors as late as possible. Much of the trouble in growing them arises from improper treatment after flowering. Sometimes they are placed under the greenhouse stage without water, or too much water is given, or else improper care or no care is taken of them. Over watering causes the roots to become diseased, and then the cuttings rarely give healthy plants. The speaker would add to Dr. Walcott's selection, the Golden Dragon, a very strong and vigorous Japanese variety, and the Golden Queen, a large Chinese variety, which retains its foliage well. Last year he struck half his cuttings in January and half in March, and those planted the middle of March were better than those planted in midwinter. They were removed to cold frames as early as possible, and planted in the open ground the last week in May. They were not watered at all during the summer. When lifted for potting, a spade was put down at one side, and the plants came up with a mass of roots. When placed in the pots they received a thorough watering, and hardly wilted. He would prefer to take up the plants when perfectly dry. The only difficulty in cultivating chrysanthemums is mildew, and this is a serious one. Some varieties are more liable to it than others, and one side of a plant will sometimes become mildewed when placed next to a mildewed one. Mr. Wood thought we should attempt to get a stock of native seedlings which would be free from mildew.

Joseph Clark had used whale oil soap successfully as a preventive of mildew on the leaves, when growing in the summer.

Edward L. Beard said that the Japanese varieties should not be

nipped as closely as the others; one nipping is enough. Another mistake is leaving them in small pots too long; they need to be grown continuously, and unless they are cannot be grown successfully. If properly nipped they can be flowered much earlier. The black lice are inveterate enemies, and are most troublesome in large gardens. The Japanese varieties are being more generally introduced. At an exhibition in England twenty-five or thirty new varieties, mostly of French and English origin, were shown. Some of the newer ones have the bright vivid colors so much desired.

Mr. Wood said that he did not mean to give the idea that none of the Japanese varieties are early, but only six out of sixteen were ready for exhibition. Discretion is needed in nipping; some varieties do not require it at all; he never nips after the 25th of July.

William C. Strong said the chrysanthemum had been spoken of as eminently fitted for house culture, but it is an objection to it for this purpose that they all bloom at one time; and he asked whether any mode of cultivation would extend the season of bloom through December and January.

Dr. Walcott answered that he had the Virginale, a pure white variety, still in good flower, and also two or three seedlings. But the habit of the chrysanthemum is to bloom in October and November, and, with most varieties, there is no way to avoid it. If the Guernsey Nugget is cut down in October, and good suckers are separated and grown in heat in winter, they will flower in May and June. There are varieties which flower in July, and with proper selection we can have chrysanthemums most of the year. He differed from Mr. Wood as to the value of the chrysanthemum for growing in dwellings, but it is valuable for decorating them. He brings them from his greenhouse into the vestibule of his dwelling house, where it is cool, and they last three or four weeks there.

Mr. Wood said that if the George Peabody and Golden George Glenny are cut down a foot from the ground, each shoot will give a single bloom. Peter Henderson says that if the buds of the Japanese varieties are cut off, so as to prevent them from blooming at the usual time, they will bloom in January.

Dr. Walcott said that his first attempt to raise seed was made seven years ago, and the third season he got all he wanted. There

is no difficulty in raising seed if the house is given up to it. The formation of seed commences in every house, but it is only perfected in a dry atmosphere. The house must be aired thoroughly, and the plants never syringed, but kept dry. To prevent the collection of moisture at the base of the flower, he cuts off the petals. It is difficult to hybridize chrysanthemums, because the bees get the start. The results of his attempts at hybridizing are not encouraging; they are not superior to those obtained from seed not hybridized.

C. M. Hovey said that the chrysanthemum is a good plant for the dwelling house. Attempts have been made to get flowers in winter, and they have occasionally been successful to some extent, but a fine display of flowers cannot be obtained. He knew one gentleman who had two or three kinds at Christmas, and possibly something might be done by retardation. It is the nature of the plant to bloom at a certain season, and it cannot be forced or retarded with much success. Except some of the new varieties, there do not appear to be as many blooming in the open garden as in former years. Forty-five years ago he grew seventy varieties, collected from all sources in this country and Europe. He had twenty-five or thirty kinds from Prince's nursery. The London Horticultural Society gave great attention to the chrysanthemum, and several long articles by Mr. Sabine, the secretary, appeared in their "Transactions" from 1821 to 1826. Pompon varieties were then known. Many of the new varieties are no better than the old ones. The first seedlings were raised from twenty to twenty-five years ago by Salter, in England, and later, by Lemoine and Crouse, in France. The chrysanthemum is an amateur plant, and requires attention at a certain time, which must be given right along, as with the fuchsia. Unless the requisite conditions are complied with, you cannot grow fine specimens and large perfect flowers. He saw at Mr. Henderson's, in New York, a thousand plants in two and a half inch pots, with from three to nine flowers each, the day before Thanksgiving. He had attempted this, but unsuccessfully; the tops ran up too high and the roots run down. The secret of success was in late propagation, the cuttings having been struck the 10th of June. Dr. Walcott saw a plant in England ten feet high, but that cool climate is more favorable to the chrysanthemum than ours.

Dr. Walcott said that the plant referred to by Mr. Hovey was

in the garden of the champion chrysanthemum grower in England. It was ten feet above the level of the pot The name of the variety was Mme. Ch. Audiguier. In September the buds were an inch in diameter. It was an exceptional plant, with only three buds.

C. M. Atkinson thought that Mr. Hovey had put a lion in the path of cultivators by overstating the care and attention required by chrysanthemums. No other plant gives so great a return for the time and money bestowed on it. It is a thousand times more easily grown than hard wooded plants. It comes at a time when the garden out-doors is stripped of flowers, and tides over a barren season. It is true that almost all of them flower at the same time, but you can get no more out of a plant than there is in it; still there are varieties which may prolong the season, one of which is Ethel, a white variety with a black eye. Not much can be done in retarding them. Mr. Hovey says that nurserymen do not grow them, but in 1881 Mr. Turner, of Slough, raised hundreds of thousands of plants for balcony and in-door decoration. In ten years we shall see a hundred plants sold where we see one now.

Mr. Wood said that the trouble with amateurs is, that they are obliged to purchase plants from nurserymen. The plants should be struck after the middle of March, and kept in cold frames, and not allowed to become pot bound until it is time to put them in the open ground.

Mr. Hovey said that Mr. Wood had expressed his views exactly. The chrysanthemum is a favorite plant with him, and easily grown.

Patrick Norton said that he grows chrysanthemum plants of very small size, because his customers prefer such. Few plants give more satisfaction in city dwellings. The chief point in their cultivation is to give them abundance of water. He propagates early in spring, and again in May; plants them out in June, pinches once or twice, and takes them up in September. He uses a fork to lift them with, and prefers dry weather for that operation, when the soil will shake off from the roots. Last year was exceptionally favorable to their culture.

Hon. Marshall P. Wilder said that the discussion had brought out the real essentials of chrysanthemum culture. They must be grown from good cuttings, and not from little wiry offsets, and kept growing both before and after they are planted out. He knew no plant which affords so good a return with so little labor,

and they come at a time when there are few flowers. No other flower is so good to cut from. He fills every available space in his greenhouse with them. Sulphur, with a little caustic lime, is a sovereign remedy for mildew in chrysanthemums, as well as in grapes.

P. B. Hovey said that Mr. Cowan, gardener to Col. Thomas H. Perkins many years ago, used a pound of sulphur and half a peck of lime for mildew, the sulphur being placed on the lime, slaking them slowly together, which caused the sulphur to unite with the lime. The tub (a half hogshead) was then filled up with water, and a quart of the solution diluted with two or three gallons of water for use. The tub was covered with a blanket while slaking, to keep in the fumes. When the lime settled, the water was left clear but tinged in color by the sulphur.

The President gave notice that, on the next Saturday, William E. Endicott would read a paper on "Lilies, and their Culture."

BUSINESS MEETING.

SATURDAY, January 20, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair. No business being brought before the meeting, it

Adjourned to Saturday, January 27.

MEETING FOR DISCUSSION.

LILIES AND THEIR CULTURE.

By WILLIAM E. ENDICOTT, Canton.

The genus Lilium is found throughout nearly the whole of the north temperate zone, and nowhere else, with the exception of the East Indian species, *Neilgherrense*, *Wallichianum*, *Philippinense*, *polyphyllum*, and one or two others, growing, however, at such altitudes as to be in a temperate climate. It is remarkable that the vast plains of Central Asia do not furnish a single species,

although so rich in tulips, fritillarias, and other bulbous plants. There are now known fifty species of lilies with, perhaps, sixty or seventy varieties, so that we have about a hundred and twenty distinct forms of this genus with which to decorate our gardens.

Some of these are, of course, much more beautiful than others, and, without attempting to decide upon matters of taste, we may take it for granted that all will agree that the dull, ochreous reds and yellows of some of the erect flowered species, such as *bulbiferum* and *umbellatum*, are less pleasing than the pure white of the varieties of *longiflorum*, or the brilliant scarlet of *chalcedonicum*.

It is not likely that many new species will be hereafter introduced, yet we may reasonably look for a few when the great peninsula of Corea shall be opened to travellers, as seems likely soon to be the case, and it is by no means improbable that some species, restricted to small and secluded districts, may be discovered by closer search in the longer known countries.

My own experience with lilies has not been extensive enough to warrant me in attempting to instruct this audience upon points of cultivation. I will speak of a few species only, leaving it to others to take up the subject.

The showiest of all lilies is, unquestionably, the *auratum*, and in a garden, a clump of it in bloom is certainly a fine sight. It is not, in my judgment, suited to pot culture, though a strong bulb will do very well the first year; yet I do not find such confined quarters conducive to the maintenance of its health, still less to its increase; the size of its flowers, too, makes it look out of place when so grown. Its proper position, therefore, I think, is out of doors. It is well known that there is a delicacy in the constitution of this species which has been the cause of much disappointment among cultivators. It has been the experience of thousands that the bulbs, after flowering pretty well for a year or two, dwindle away and die, leaving no offsets. I believe that the gardens are few which can show clumps of this lily in perfect health that have occupied their positions five years. I have planted great numbers of these bulbs in soils and positions as different as I could contrive, but all have followed the same road to decay and death, except a lot of six, planted ten years ago in ordinary garden soil, which are now in good condition, except two, one of which had its shoot knocked off three years ago by a hoe in the hands of a careless man and has not flowered since, though there

are several shoots from offsets which started into growth upon the death of the central stem. The other one did very well until two years ago, when the underground shoot of a plant of *Arundo Donax* pierced the centre of the lily bulb. The four remaining, which were planted as single bulbs, send up five or six growths annually, and blossom well. These bulbs have done better than any others of my own or of my neighbors', and I ascribe their success, imperfect as it is, to the fact that they were set, originally, between twelve and fifteen inches below the surface. I have since come to the conclusion that all lilies should be planted deep rather than shallow. To get a sound, strong stock of *L. auratum*, I should depend on home grown bulbs, raised, I mean, from the seed; for such seem better adapted to our climate than Japanese bulbs. The same is the case in England, where such sell from twenty-five to fifty per cent higher than the imported ones. It appears to be necessary, or, at any rate, beneficial, in the case of this and all other species to provide a partial shade for the lower half of the stem. We read in the English papers of *Lilium auratum* eleven feet high, and floriferous in proportion. If anything approaching this has ever been achieved here, it has not come under my notice. A remarkable thing with *L. auratum* is its variability in the time of flowering. In my own garden I have bulbs in flower frequently in June, in September and in the intervening months, and, stranger still, the plant which flowered early, one year, will frequently come into bloom late, the next.

The most beautiful lilies, in my opinion, are those belonging to the sub-genus, Eulirion; what we may call the Longiflorum section. These are mostly white lilies, various in shading and form, such as *longiflorum* and its varieties, *Wallichianum*, *Neilgherrense*, *Philippinense*, etc. The best known of this group are *candidum* and *longiflorum*, so much grown for florists' use. *Candidum* is one of the oldest garden lilies, and, take it all in all, the finest, in my opinion. It likes a moderately moist, moderately rich soil. If it has this it will grow to perfection with exceedingly little care. It is the only lily which I have cultivated that has ever been injured by insects. Three years ago, when my bulbs of this species were about to blossom, the buds, instead of opening, seemed to hesitate a day, as if to make up their minds, and then decided it unanimously in the negative, withered and drooped. An examination showed that each stalk was pierced a few inches below the

lowest bud with a hole as large as a knitting needle, and I found that a grub had eaten its way up the middle of each stalk, devouring the pith as it went. I killed every one of them, and have not been troubled since.

Lilium longiflorum is marked in some catalogues as not being hardy. I was deceived by this for a long time, and I speak of it now because there may be some here who do not know how incorrect the statement is. I hardly need say that *Lilium longiflorum* will endure any winter we are likely to have in this latitude, provided it is planted in a soil light rather than heavy. In my hybridizing experiments, I have not found it easy to induce this species to set seed, though I have tried it with pollen of *Philadelphicum*, *Canadense*, *superbum*, and others. The opposite fertilization is easy, all the last named species forming abundance of seed when treated with the *longiflorum* pollen. I say nothing of forcing this species and *candidum*, for I have never had any experience, but perhaps those who make a business of it will pardon me if I make a suggestion. A lily deprived of its anthers is deprived of all expression and character, and of nearly all beauty; why not find some means of keeping the pollen inside of the anther, and so present the lily in all its unmutilated loveliness. I believe that some way could be found to accomplish this, without much trouble.

Our native lilies—those of the eastern States—vary to a considerable degree, and the finest forms are very beautiful, and well repay the trouble of getting and caring for them. The *Lilium Philadelphicum* is often found of a dull red; but sometimes, and not rarely, its color is exceedingly pure and intense. The finest flowers I have seen of this kind grew in a little open place in the woods of New Ipswich, in southern New Hampshire. The species is very abundant in southern Maine, and the flowers may be seen by thousands on both sides of the railroad between Portsmouth and Portland. I have never seen more than five flowers on a stem, though I have heard of as many as nine. *L. superbum*, so abundant in southeastern Massachusetts, is well named. Its pyramids of flowers of various shades of scarlet and crimson, mixed with yellow and spotted with brown, make it truly superb. This species requires more dampness in the soil than most kinds.

Lilium Canadense is the most common kind in most parts of New England, and varies quite widely in regard to height, depth of color, degree of spotting, breadth of petal, etc. The best

forms are hardly surpassed by any of the colored lilies. I often think of a plant of this which I once found, as illustrating how little we know of the possibilities of any species of plant. *L. Canadense*, as we usually see it, has one, two, or three flowers. Fine specimens have from five to seven, and a stalk bearing from nine to twelve flowers would be regarded, I suppose, as something quite out of the common growth, as indeed it would be; but the astonishing specimen I speak of had a pyramid of twenty-two expanded flowers and three buds, upon a stalk seven feet high and an inch in diameter. And this was not the result of cultivation; it was unaided nature, taking advantage of unusually favorable conditions. The plant grew in the gravel of a railroad embankment, which ran down into water. It thus had an exceedingly porous soil, with an abundant supply of water brought up by capillary attraction.

I spoke in the beginning of this paper of the possible finding of new species. We cannot go to Corea or India to look for them, but we have as good a chance of finding them here in Massachusetts; and, better and more gratifying still, what we find here may be of our own creating. Though we know, by the experience of Mr. Parkman, that the chance of getting a good thing by hybridizing is not one in a thousand, yet the same experience shows us that successes are possible which may outweigh the nine hundred and ninety-nine failures a hundred times, for *Lilium Parkmanni* is equal to any lily known. What a beautful thing might result from a combination of *longiflorum* and *Canadense*, of *candidum* and *Philadelphicum*, of *auratum* and *chalcedonicum;* and how immeasurably easier to tend a thousand or ten thousand seedlings in your own garden than to search for rarities among savage men, ferocious beasts, venomous reptiles and miasmatic swamps, enduring pestilence, cold, heat, hunger and thirst.

Nor is it certain that hybridization must be confined to crossing a lily with some other lily. Different genera among other families are not unknown to have been successfully crossed. Colonel Wilder has experimented in the use of Gloriosa as one parent with some species of Lilium as the other, and the genera Littonia and Sandersonia appear to be as well adapted to such use. It is in hybridization that a real flower lover will find his greatest pleasure.

Discussion.

Charles M. Hovey was called upon as having had much experience with lilies, and said that it was a subject of great interest to him. He had devoted much attention to the genus, beginning with *Lilium lancifolium*, about 1841, and as early as 1844 attempted to hybridize it, producing the variety Melpomene; and the beautiful seedling which surpasses even *L. auratum*. He had paid but little attention to native lilies. If he could have but one lily he would take *lancifolium*. This species is one of the hardiest as well as the most beautiful. He thought the trumpet-shaped lilies are spoiled by impregnation with the other species. He made twelve different crosses of various lilies including *candidum* and *longiflorum*, but the seedlings had the petals all slit into narrow pieces, and he gave it up and confined himself to *lancifolium* with *auratum*, *punctatum*, *superbum*, etc. He could see a difference in the seedlings which would not be noticed by an untrained eye, and had selected nine varieties, varying in the size or breadth of petals, intensity of color, number and size of spots, etc. He could not say that *L. longiflorum* is as hardy as some of the other lilies, as his own bed had suffered; but this may have arisen from a combination of causes. He had had bulbs of *lancifolium* survive the winter lying on the ground. *Lilium auratum* is, practically, a failure here. He saw the stem of a plant, out of bloom, at Weybridge, England, eleven feet high. It was in a rhododendron bed. He had planted several bulbs in a rhododendron bed, with peaty soil, and they had flourished, and he hoped for further improvement. It seems to be very particular as to soil and situation; millions of the bulbs have been imported from Japan, but a small part of which survive. He thought *L. Parkmanni* did not propagate rapidly, but partook of the character of *L. auratum*.

Mr. Hovey spoke of the beauty of our native lilies, but said that on Cape Cod, where he had seen *L. superbum* with eighteen flowers, they were never cultivated, though around almost every farm house you would see tiger lilies. He had never found *Philadelphicum* with more than three or four flowers; bulbs the size of a pea will flower. The finest he had ever seen were where the ground had been burnt over. He agreed with Mr. Endicott, that the lily might be hybridized with other genera. If we could get a *lancifolium* of a bright yellow, or straw color, it would be a great

acquisition. Crossing with *superbum* would not do it. *Lancifolium album* fertilized with *tigrinum*, produced a beautifully spotted flower. Lilies are very peculiar in regard to impregnating, and great caution is required to see that they have not already been self-fertilized. The petals are closed in on the stamens, and the flowers must be opened early and the stamens cut away. Mr. Hovey thought that all lilies should be planted about five inches deep, and protected with a few leaves. The soil should be well drained, and not too heavy; for *L. candidum*, it may be stronger and richer. Charles A. Putnam, of Salem, who has been very successful in cultivating lilies, gives all his lilies a liberal dressing of peat every year to great advantage.

Mr. Endicott said, in regard to Mr. Hovey's doubt whether the *Lilium longiflorum* is quite hardy, that it grows naturally in a warmer climate than any other we cultivate, and if the shoot is caught above ground it has not the power of resisting cold. He takes up his bulbs and keeps them out of ground until November to prevent them from starting. In answer to an inquiry how often other lilies should be transplanted, Mr. Endicott said, that, excepting the *longiflorum*, he allows them to remain an indefinite period.

William Falconer, of the Cambridge Botanic Garden, said there were two species which he wished to add to those mentioned, namely: the little Siberian *pulchellum*, and *tenuifolium*. They germinate in eight or ten days, and flower when two years old from seed. He had found *longiflorum* hardy; the little bulblets on the stems, when removed and planted, flower in two or three years. He saw *Melpomene* in England, a few months ago, where it was regarded as the most beautiful of all the *speciosum* lilies. *L. Hoveyi* is as good as *Parkmanni*, and not so hard to propagate.

Mr. Hovey said that tiger lilies will stand ten years without transplanting; *L. candidum* four or five years, and *L. lancifolium* two or three years; but he takes up all his lilies every year. He had seen tiger lilies, in the garden of a friend, seven feet high, in sandy soil on Cape Cod. *Lilium superbum* improves by being let alone. The seed of *L. Canadense* will lie in the ground for many years. They grew naturally in his nursery, which was cleared up in 1841; and two years ago some lilies came up there, where they had not been seen before for thirty or forty years, which he could only account for on the supposition that the seed or scales had remained in the ground for that length of time. *Lilium Harrisii*

was shown at Philadelphia with from three to six flowers, and *L. floribunda* with twenty flowers on a stem. A lily from Bermuda, supposed to be the same as *Harrisii*, was exhibited before the New York Horticultural Society, with one hundred flowers on a single stem. Bulbs not larger than a pea will flower the next summer. How it came to Bermuda, and why it was not introduced here before, is a matter of curiosity and surprise.

William C. Strong recalled Mr. Hovey's experiments in hybridizing *Lilium lancifolium* many years ago. His beds of seedlings were remarkable examples of success. The *longiflorum*, and similar species, are, however, more practically useful to the florist than *lancifolium*. He had grown *L. candidum* under glass as easily as potatoes, and by the bushel. The bulbs were planted thickly in the border, and produced six, eight, or ten flowers each on stalks five and six feet high, with no sign of disease. Perfect bulbs were produced on the stems, owing to the uniform humidity of the atmosphere. This species is subject to blight, which appears as if caused by a fungus before blooming. He was at E. M. Wood's greenhouse in Natick the day before, and saw thousands of vigorous plants of *L. Harrisii*. There was a bank in flower of plants eighteen inches high, in pots, and as strong as *L. longiflorum*. These were from bulbs the size of a pea; every little scale produces a bulb, and yet this small size flowers abundantly, and it looks as if it would displace *L. longiflorum* for florists' purposes, unless the size be too large.

Warren H. Manning had cultivated sixty species and varieties of lilies. *L. Humboldti*, a Californian species, grew three or four feet high, and produced eight flowers. *L. Thunbergianum*, or *elegans*, is of a dull color, but the easiest of all to grow. They are good in mixed borders, as they flower low down, and make a brilliant display. He had seen *L. Canadense* with the leaves both in whorls and alternate, and some stems with thirteen or fourteen flowers each, on the edge of a meadow where the soil was moist, but the water would not settle. *L. superbum* increases rapidly, and flowers in almost every soil. He had seen but little difference in the varieties of *L. longiflorum*. His only success in hybridizing had been with the immature flowers of *L. Pyrenaicum*, having only the stamens visible, which he hybridized with *L. Canadense*, and obtained seed.

James Cartwright said that his experience with the *Lilium*

auratum had been like that of the essayist. He had one row where all the bulbs died but one, which had eleven blooms; he took this up and made two of it, and now has a dozen from it. It can be propagated by scales in moss or sand.

Mr. Hovey thought the blight on *Lilium candidum* was local, and caused by peculiar weather at a particular season of the year. Two or three years ago, a rain storm of three or four days came when his *lancifoliums* were about to bloom, and they also were affected. He did not think it a fungus, though fungus might be engendered.

President Hayes spoke of the great number of the *Lilium superbum* on the line of the Old Colony Railroad, which so fascinated him with their beauty, that he had a quantity of the bulbs collected and planted them in beds prepared with peat, and they have grown superbly. No lily is more beautiful, and it is desirable to use all means to extend its cultivation. He thought it a thing to be proud of that one of our members has, with his own hands, produced the finest lily in the world.

Mrs. H. L. T. Wolcott said she found *Lilium superbum* growing on a dry hill in Taunton, and collected a quantity of the dry bulbs and planted them in similar soil, but two which she put in lower and moister soil, did much better, and she wondered if all would not have done better there.

Mr. Hovey said that about eight or ten years ago, he was told that *Lilium superbum* grew abundantly on the line of the Old Colony Railroad, and he contrived to get a dozen from among the roots of trees, where a trowel was of but little use. This was in a depression covered with water in the winter. He found them at Bristol, R. I., and Marion, Mass., under the same circumstances, but never saw them on high land.

F. L. Temple, spoke of a remarkable specimen of *Nyssa multiflora*, or Tupelo tree, two feet in diameter, forty-five feet high, and of equal spread. It has no branches until within seven or eight feet from the top, when they come down like a Kilmarnock willow, forming a great hollow dome. This form is not the result of pruning, as suckers from it take the same form. Professor Gray, and Mr. Dawson of the Arnold Arboretum, thought it a remarkable tree.

J. W. Manning said he had known this tree for twenty years. It

stands in a pasture on the Malden Poor Farm. Mr. Stiles, who formerly had charge of the farm, took up the bushes around the tree and pruned it up, and it had the effect of adding to the vigor of the tree and spreading the top, so that the ends of the branches drooped. The speaker had thought of getting the tree photographed.

Charles M. Hovey said that the tupelo tree is not very common. There are three or four in Cambridge, some of them from sixty to one hundred years old. They have round, umbrella shaped heads. Mr. Flagg says that the growth is sometimes upright and sometimes round, or umbrella shaped. Mr. Hovey has a tree twenty-five feet high, which he raised from seed in 1862. The tupelo is a very beautiful tree but somewhat difficult to propagate and transplant.

The subject was referred to the Committee on Large or Interesting Trees.

It was announced that on the next Saturday, the subject would be "The Best Kinds of Fruits for Export," to be opened by E. W. Wood, Chairman of the Fruit Committee.

BUSINESS MEETING.

SATURDAY, January 27, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Annual Report of the Committee of Arrangements was read by the Secretary, accepted, and referred to the Committee on Publication.

Adjourned to Saturday, February 3.

MEETING FOR DISCUSSION.

THE BEST KINDS OF FRUIT FOR EXPORT.

E. W. Wood, Chairman of the Fruit Committee, was appointed to open the subject, and said that fruit was commonly looked upon

as an article of luxury and for domestic use, but the question of today presents it in a different light. Small fruits are not yet exported in a fresh state, but the speaker thought that grapes, both out-door and from under glass, might be raised successfully and profitably for export. We need an out-door grape that can be depended on; at present the Concord is the most reliable, but it is a total failure one year out of five. Whether Moore's Early will fill the place remains to be seen, but it has been tested eight or ten years, and seems to be the thing needed to give a sure crop in different soils and locations. Mr. Wood thought we could grow hot-house grapes successfully to export. There is an impression that it costs a great deal to grow grapes under glass, but it can be done very cheaply in a cheap house where the vines are planted on the outside. Where it is possible, the back of the house should be placed against a building or fence. If one has such a location, he needs only to put the glass in place to have a house. The wider the house is, the better. The border need not be more expensive than a flower or rose bed, and once made will last a long time. The vines will require little more care than Concords; they should be pinched from two to six times. The question is one of facilities, expense, and demand. Few grapes are raised in Europe in cold houses; fire heat is given in spring and autumn at least. Here we have plenty of sunlight, but we need something to lengthen the season, and this is supplied by a house without fire heat, which will enable us to grow grapes for exportation successfully. In England they grow enormous bunches, but size is gained at the expense of quality. Robert Watt, well known here as a successful cultivator of grapes under glass, had a visit from a brother Scotchman, also an expert in grape culture, to whom he gave a bunch of Black Hamburgs, weighing not over half a pound, without telling him the variety, and so superior was the flavor imparted to it by our bright, warm suns, that he took it for a new variety, and thought it the finest he had ever tasted. In England they have not so much sun in August and September as we have, to give quality.

There is no reason why we cannot grow pears for export. The blight, which was the only enemy, is now disappearing. The pear is the most reliable of all fruits for an annual crop, and there is no difficulty in transporting late varieties like the Beurre Bosc, Seckel, Doyenne du Comice, Duchesse d' Angouleme, Beurre d' Anjou,

and Dana's Hovey. Few persons would grow a greater number of varieties for sale here.

It has been shown conclusively that there are no better apples for export than those raised here. Canadian buyers have been in our market lately, buying up all that could be found. The demand is so general that there is no such thing as glutting the market, and it relieves us of a surplus which, in some years, has made the apple crop a nuisance. Last year was the bearing year, but the crop was small, yet large enough to glut the market, but for the demand for export. The export trade has grown up in the last ten years; it was begun by New York growers. In 1878, 300,000 barrels were exported; and in 1880, 1,400,000 barrels. Last year not so many were exported, because they were not to be had. We have passed the time of glut. Probably nine-tenths of the apples exported are Baldwins. One can hardly make a mistake in planting or grafting this variety. It grows vigorously, bears early, is of good size and quality, and as a keeper is second only to the Roxbury Russet, and it is at home here in its native State. It is remarkable that the four or five best apples for exportation are all natives of New England, and several of them of Massachusetts. Growers in this State have the advantage of being located near the best shipping port. There are thousands of acres suitable for orchards within twenty miles of Boston, which can be bought for fifty dollars per acre. The best land is not required; springy hill-sides, and rocky land, if you can get the plough into it, make excellent orchard sites. On southern hill-slopes the trees present their tops to the light and air, which give color and beauty to the fruit.

Some object that it takes too long for apple orchards to come into bearing; but when the speaker was thirteen years old, he persuaded his father to plant some apple trees, and assisted him to do it, and a neighbor who passed, said they were doing a good work for the boy; but, though the trees had a life and death struggle with the cattle, his father lived to pick from ten to fifteen bushels from each tree. The speaker knew an orchard of a hundred trees in Brookline, which bore one hundred and twelve bushels the eighth year. The ground between young apple trees is not lost, for three times as many peach trees may be set between them, which will have room for eight or ten years, and, if as productive as for the last few years, will pay for the cultivation of the whole.

Mr. Wood said he would make an effort to cause his trees to bear fruit in the odd year, and quoted Mr. Wilder as having said it is settled that this can be done. The speaker said he had two small trees which he grafted with Hubbardston Nonsuch, from an even year tree. In four years they showed blossoms on the even year; these were plucked off, and the next year they bore a small quantity of fruit. The third year all the blossoms were removed again, and the fourth year they gave all the fruit he wanted. The next year they did not blossom, and now they bear regularly on the odd year.

Another phase of apple exportation is in the evaporated form. These are most popular, bringing eighteen cents per pound when ordinary dried apples command but seven cents. The entire crop, or only the fallen and bruised apples, may be used in this way. It is more important away from the seaports than here, and in the west is carried on on a large scale.

Charles F. Curtis, gave an account of the method of selling apples in England. This is wholly by auction, though they may be consigned to some dealer there. There are five auctioneers in the business in Liverpool, and all the apples received are sold by one of them. The sale is held in a large amphitheatre, in the centre of which is a large table, on which a barrel of apples of each mark is poured out as a sample. The five auctioneers sell in rotation, each one three-quarters of an hour at a time. The first catalogue may include oranges, nuts, raisins, etc. The first auctioneer must step down when his time has expired, and the next one may have apples. If one sells out his list before his time is out, the remainder is divided among the others. The sale continues, if necessary, until ten o'clock at night. Each sample of apples represents twenty barrels, in which quantity they are sold. If a barrel turns out better than the sample, the purchaser gets the advantage; if it is poorer, he must bear the loss. After the others are disposed of, the sample is sold; if the others have brought twenty-five shillings and sixpence, the sample will probably bring twenty-two shillings. The understanding is that the apples shall be perfectly tight in the barrel; when such bring twenty-five shillings per barrel, "shakers," or those settled half an inch in the barrel, owing to slack packing, will bring four shillings less. The next grade is "wet and wasty," which bring only half the price of the best. The Baldwin is the only variety sold to any

amount; probably from seventy-five to eighty per cent are of that variety. It is a universal bearer, and the only one which can be supplied in sufficient quantity to send a thousand or two barrels. Retail lots and odds and ends are not wanted. Sometimes all the apples sold are not delivered; if not landed in time, the sale is void. The sales are held three times in a week. The extensive export of apples dates from the time when it became apparent that New England could raise all the apples needed there for home consumption. Then the New York growers began to ship to Europe; this was about ten years ago. Last year there was not so much surplus as in some years. Some of our apples are sold as Canadian apples. The speaker supposed that some dealers in Liverpool received apples directly from the exporters here to sell, but he filled an order from one of the largest dealers here, and the day after they were received they were sold at auction. Apples for export should be packed well. High colored and medium sized specimens should be selected and placed in the bottom of the barrel, as closely as possible, and with the stems all down; the barrel should then be filled up, being shaken as often as a basket full is put in. It should be filled half an inch above the chimes, and the head pressed in by means of a screw. The barrel is then turned over and marked on the faced head, so that when opened it shows an even and uniform surface. Apples thus faced will bring from twenty-five to fifty cents per barrel more than those not faced. There is very little demand for sweet apples. Apples are sometimes shipped successfully in warm weather, when later shipments in cooler weather will decay. Sometimes a cheap grade brings a proportionally higher price than the first quality.

Leander Wetherell said he had heard of the middle of a barrel being filled up with inferior apples, or with a pumpkin.

Mr. Curtis said that such things did sometimes happen.

Mr. Wetherell had known of apples being sold here to dealers from Canada, and shipped directly to Liverpool as Canadian apples.

J. W. Manning spoke of a young man who went to Kansas during the exciting times about twenty-five years ago, and who now has an orchard which he raised from seed, and from which he gathered in one year ten thousand bushels of apples, which netted him forty cents per bushel. People come with teams from all the country round to get them.

O. B. Hadwen said that he planted the seeds of his orchard in

1843, and had set out twenty acres, which he has watched from seed to maturity. He felt considerable enthusiasm then, and told his wife that the profit of the orchard would pay their expenses when they were old, but ideas of living have changed, and it does not. Nevertheless, he felt like encouraging the planting of orchards, for he believed that there is a better prospect ahead for them than in past years. Mr. Gold, the Secretary of the Connecticut Board of Agriculture, told him that all the apples in the eastern part of that State, last year, were sold to a firm on Long Island, who furnished boxes, and paid one dollar per box for everything over two inches in diameter. They were used for canning and evaporation, and the cores and skins for cider and jelly, so that nothing was wasted. This manufacture opens an opportunity for a very large traffic.

John B. Moore confirmed what the Chairman of the Fruit Committee had said as to the adaptation of the soil of Massachusetts to apple culture. There can be no doubt that it is one of the best. The seedlings originated here prove it. Such varieties as the Baldwin, Hubbardston Nonsuch, Foundling, Williams's Favorite, Sutton Beauty, Danvers Winter Sweet, Leicester Sweet, Hunt Russet, Garden Royal, and others, would only have been produced on a soil favorable to the apple. No other State can show such a record in regard to apples of established reputation. Rocky hillsides, and land unfit for other crops will produce the best quality of apples, and we have the best facilities for shipment, for Boston is one day nearer Europe than New York, and this may make the difference between profit and loss. If he were a young man he would plant apple trees. For exportation, apples must be grown better than heretofore. Farmers fail in sorting and packing, though the dealers are partly to blame for this. He knew an orchard in Middlesex County, where the owner did not wish to assort the fruit, and sold it to a dealer in a lot. The directions of the dealer in regard to packing were to put a large basket of good fruit in the bottom of the barrel, then a basket of the poorest, and then fill up with good. These would do better to send coastwise than to foreign markets. There is an evaporator at work, successfully, in Littleton, and this use of apples will prevent their being sold for a dollar a barrel.

D. W. Lothrop said that the Roxbury Russet has been very popular, but it is rather difficult to grow, and he thought it was

waning in reputation. There are two other important russet apples which are probably eligible varieties for export, — the Red Russet and the Hunt Russet. The Red Russet was found by Mr. Cole to keep as late as the Roxbury; the flesh is firm, and the tree is more vigorous than the Roxbury, and the crop may bring more money. The Hunt Russet is exceedingly fine; Mr. Cole thought it the best in quality of all the russets. The speaker had known a barrel of fine specimens sold for ten dollars, and they almost always bring five dollars. The Red Russet is not as good a table apple, and he had regrafted his with the Hunt Russet, which is fair and keeps well, and will probably bring more money than either the Red or Roxbury Russet. The Baldwin, Roxbury Russet, and Rhode Island Greening have heretofore formed a kind of trinity, which has held together for a great length of time. The Snow apple is of exceedingly fine quality, and is raised in great quantities in Canada; and though not late keeping, perhaps ought not to be overlooked by the exporter. The Hubbardston Nonsuch will keep till February, but then becomes rather mealy. The New York Spitzenberg is very fine, but whether it could compete with the russets is rather doubtful.

Mr. Hadwen said that the Snow apple will succeed only on limy soils.

Leander Wetherell quoted from the Report of the Commissioner of Agriculture in Canada West, in regard to apples the most approved for general cultivation there. The Baldwin is one of the most popular. The only objection to the Rhode Island Greening is its color. The Esopus Spitzenberg was favorably spoken of. The Golden Russet is good, and the Roxbury Russet the longest keeper. The Ribston Pippin is a shy bearer. The Red Canada (known here as Old Red Nonsuch) is a long keeper. The Swasey is small, but delicious; of a handsome cinnamon russet, and the tree is vigorous. It has brought twenty-five dollars per barrel in London. The Snow apple has spotted badly; it is red, with very white flesh. The King of Tompkins County was well spoken of. The Newtown Pippin brings the highest price in the London market, but has suffered from other varieties having been sold under that name. Mr. Pell had grown an orchard of this variety on the Hudson River, and shipped the fruit for years. Tloman's Sweet is very good. Colored apples are more popular than those not colored; perhaps the Williams's Favorite is the highest colored of all, but the quality is not extra.

Mr. Curtis said that out of five or six barrels of the Snow apple, perhaps only two would be free from black spots, and the Esopus Spitzenberg the same; otherwise they would sell for more than Baldwins. The Snow is too tender fleshed for exportation.

Mr. Wood thought it important to place the Society on record correctly. There is no doubt that the apples originated here grow best, and are most profitable here. Though the Newtown Pippin once brought a higher price in London than any other apple, today the Baldwin will bring more than the Newtown Pippin.

President Hayes spoke of a gentleman who sold a hundred barrels of Hunt Russets for five dollars per barrel.

Mr. Wetherell said that he had grafted most of his apple trees with Baldwin. He got grafts, from the late James Eustis, of "odd year" Baldwins, which seemed to perpetuate the habit.

William H. Hunt said that he lives on the farm where the Hunt Russet originated. The farm has been occupied and inherited by the family since 1635. His father, who died a few years ago at the age of seventy-five, did not know when the variety originated. If more extensively cultivated, it would make a fine shipping apple. The tree is more hardy than the Baldwin, being never winter-killed, while the Baldwins were destroyed in 1832, and again in 1857. The Baldwin is hardy on high ground, but not on low. The Hunt Russet is of fine quality, spicy, and a good bearer and keeper, but a little subject to be knurly. The cider made from it is superior to that made from the Baldwin. A Baldwin apple may freeze a little without injury, but a Hunt Russet may freeze quite hard and not hurt. The Hunt Russet is not as large as the Baldwin.

Mr. Hunt said that his experience in buying fruit while travelling in Europe, is that it is ordinarily not so good as in the markets of America. He saw fine apples in France and Germany, but they were scarce, though there were many inferior cider apples. The Beurre d'Anjou pear was of fine appearance, but it did not come up to the quality of pears here, being coarse and rough. In Italy, he was surprised that the oranges were not sweeter; excepting the Mandarin oranges, they were not superior to those brought here from Europe.

Benjamin G. Smith, said a word of encouragement to plant orchards. A relative of his, at the South Shore, planted an orchard at the age of sixty-five, and lived to be eighty-five.

Mr. Curtis, in answer to an inquiry, said that he did not think

cold storage would keep apples a month later than ordinary, and a great disadvantage is that they must be used as soon as they are taken out. Years ago his firm had three or four thousand barrels of Roxbury Russets stored every year to put on the market late in the season. Now very few are stored, owing to the improvement in early southern apples, which formerly were shaken off and raked up, but now are gathered and packed properly. Since the war, many Jersey farmers have gone south and improved the quality of the fruit and vegetables grown for market. The apples ripening in May are known as May apples, and those ripening in June as June apples.

Benjamin P. Ware gave an account of a fruit evaporating factory in Georgetown, Mass., which he had examined. The fruit purchased is largely windfalls, and the quantity is ascertained by weighing the loads. The apples are first pared and cored with machines worked by boys and girls, and then placed in drawers of lattice work, through which a current of air heated by a coal fire is made to pass. The beautiful whiteness is caused by placing them in a sulphur bath before they are evaporated, which not only whitens them but closes the pores so that they remain white. This part of the work is very disagreeable to those engaged in it. The price paid for windfall apples is from fifteen to twenty-five cents per bushel. The refuse of the apples is grated and made into cider. The factory is quite profitable, and affords an outlet for the surplus of apples raised in the neighborhood. Squashes are also evaporated there. Mr. Ware thought it evident that the demand for apples is going to be unlimited, and as many old orchards are going to decay, and few new ones are planted, unless a change takes place the supply of home grown apples will not equal the demand.

The Chairman of the Committee on Discussion announced that on the next Saturday Dr. James R. Nichols would speak on the "Use of Artificial Manures in Horticultural Work."

BUSINESS MEETING.

SATURDAY, February 3, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President, as Chairman of the Executive Committee, reported the appointment of George W. Fowle as Treasurer of the Society and Superintendent of the Building, and Robert Manning as Secretary and Librarian, for the year 1883.

The Annual Report of the Treasurer was presented by him, and read by the Secretary, accepted, and referred to the Committee on Publication.

The following named persons, having been recommended by the Executive Committee, were on ballot duly elected members of the Society.

WILLIAM O. GROVER, of Boston.
ARTHUR H. FEWKES, of Newton Highlands.
ELI A. SAWTELLE, of Boston.

Adjourned to Saturday, February 10.

MEETING FOR DISCUSSION.

The following paper was read by the author, who remarked that though his subject differed from that announced by the Committee, he should make the latter incidental to that which he had chosen.

THE SWEET PRINCIPLE OF FRUITS AND PLANTS.

By DR. JAMES R. NICHOLS, Haverhill.

The most interesting phenomenon connected with the growth of fruits and vegetables, is the development in their structures of chemical principles which influence in a peculiar manner the sense of taste. A variety of impressions are produced upon the nerves of taste, some of which are agreeable, and others disagreeable, by bringing in contact the juices of certain fruits, roots, grasses, leaves, etc., in their mature and fresh condition. The sense of sweetness is usually agreeable, while the sour and the bitter are of the opposite character.

The term sweet is applied to a class of bodies which are found

in fruits, and in a considerable number of vegetable structures, but we do not clearly understand *how* they are capable of exerting so decided and pleasurable an influence upon the palate, not only of human beings, but upon animals as well. As we walk through our gardens and orchards, and watch the growth of the luxuriant products of the soil, we do not often stop to consider the intricate and wonderful chemical reactions which are unceasingly taking place in everything that springs from the earth upon which we tread. We place the luscious ripened fruits upon our tables, and partake of them with deep sensual gratification, but we do not often consider the origin and nature of the complex agents which render them so acceptable.

The sense of taste is in some respects the most mysterious and wonderful of all the senses. If the sense of touch is, as seems probable, the parent sense, or the primal avenue through which mind was able to assert itself, it must be that taste was the next most necessary sense for man's elevation and protection. All we know about it chemically or physiologically, is that a delicate network of nerves ramifies through the tissues of the tongue, and in surrounding or adjacent parts, and that they have the functional duty to perform of conveying to the "central office,"—the brain,—sensations as regards the nature of what is brought in contact. If we examine into the chemical or physical character of these nerves, we do not find that they are in the slightest respect different from the optic or auditory nerves which transmit sensations so absolutely unlike. They are the same in color, structure, and chemical constitution; but how different their office! Nature has fixed limits to our fields of investigation, and however anxiously we may inquire, we cannot take a single step over the boundary line which divides the known from the unknowable. We must content ourselves, therefore, with the act of bringing substances in contact with the little telephonic nerve conductors of the mouth, and permit them to inform the interior man, whether they are noxious, or innoxious, agreeable or disagreeable, and not ask *how* the messages are conveyed.

Substances characterized by sweetness, are assumed to contain an organic product called sugar, and, as a class, vegetable structures do contain it in some one of its forms. There are, however, a few substances which have a sweet taste not due to sugar. Acetate of lead is an example afforded in the mineral world, and glycerine is a sweet liquid, the base of fatty acid com-

pounds having no sugar. There is a form called *hepatic* sugar, which is a product of the liver, and some of the secretions of the body contain it. It is, however, in the organic world that we find sugar in the vast quantities needed by man, and in the juices of fruits and plants we find its hiding place.

Before vegetable physiology and chemistry were understood, the belief prevailed that all the characteristic constituents of fruits and plants were in some way hunted from the soil, and conveyed to their resting places by the sap, which was known to circulate through living vegetable organisms. Although no sugar could be detected in any soil by the most persistent scrutiny, yet it was supposed that sugar, and its associated acid and other plant constituents, were present, and ready for transportation by the ascending sap. We are disposed to smile at this error of our fathers, but we should remember that, in accounting for natural phenomena, or seeking for a reason for things, the easiest and shortest path is the one usually followed. This remains true until we are guided by facts learned from accurate observation and experiment, or until science becomes sufficiently robust to act as an unerring guide.

Science, in our epoch, is capable of explaining many of the former mysteries of plant movements and plant production, and we now know the source of the sweet principle of fruits and plants, —we know that the soil has no direct agency in supplying sugar to any organic structure.

Sugar is a very remarkable substance, and its investigation opens to view surprises and paradoxes not afforded by any other agent in nature. It is highly complex in its organization, having a high atomic constitution, and yet it is the simplest of all compounds when considered in regard to the nature of the elements of which it is composed.

In studying the sweet principle of plants, we soon discover that they possess the capability of elaborating more than one variety of sugar in their structures, and that there is a curious blending of several forms in the ripened fruits which come upon our tables. We discover, also, that each plant has the power of manufacturing a special variety, or a combination of varieties, and that this law of their constitution cannot be changed by man.

In beet roots, in the stems and trunks of the sugar maple tree, the sycamore, the palm, in sugar canes, in the sorghum plant, in

the stalks of maize, in grasses, we have one kind of sugar, called *sucrose*, which is the sweetest variety; in grapes we have another distinct variety, called *dextrose* or *glucose;* in apples and other fruits we have still another, called *fructose* or *levulose*. In melons we have a sweet which is nearly pure sucrose, or cane sugar. We learn from this examination not only that sugars differ widely, but that, for wise and doubtless beneficent reasons, the Supreme Intelligence has not permitted all fruits and plants to be sweetened alike. In that vegetable monstrosity called a beet, which is hidden from the clear sunlight and the air during the whole period of its growth, there are found juices which hold the most noble and valuable form of sugar known to man. The crimson tissues of this root contain the snow-white sugar which graces the tea tables of the kings and princes of continental Europe; and millions of pounds find their way into commerce, always commanding the highest prices. The humble, earthy beet, can hold up its head in pride, when its sweetness is contrasted with that of the petted grape, which occupies the foremost place among our delicious fruits. The grape is sweetened with glucose, an ignoble form of sugar which the chemist can make in the laboratory, and its production does not require the employment of costly or rare materials. Even if it lessens our respect for the tempting fruit of the vine, the truth must be told. The chemist can make the sweet juices of the grape from old cotton rags and old newspapers; and if this statement does not indicate a sufficiently low origin, I have only to remark that it can be made from common sawdust as well. Human art has not yet been able to number among its triumphs the production of the sugar of the beet, the maple, or the cane.

The sweet principle of fruits, other than the grape, cannot be imitated in the laboratory. It is a mixture of at least two forms of sugar, — sucrose and dextrose, — in varying proportions, as is shown in the tables on page 51.

How curious and mysterious is this plan in nature, of delicately adjusting the taste of our noble fruits, so as to produce a sense of the highest enjoyment in their use. In some fruits we find the sweet to exist in its lowest modified form; but this is not due to a lessening of the amount of the sweetest sugar, but to the presence of an entirely different kind. It is probable that the peculiar delicate flavor and taste of the grape could not be secured by any adjustment of quantity of sucrose or cane sugar, or by any mix-

tures. It requires glucose, pure and simple, to act in conjunction with the delicate acids, in order that we may have this fruit in its highest perfection. The watermelon would not be the fruit it is if it had not the capability of manufacturing cane sugar in large quantities; neither would the apple, the peach, the cherry, the strawberry, or the pear be what they are, if the plants and trees upon which they grow had not the power of bringing into play a subtle chemistry, by which is produced a mixture of distinct forms of sweets which no art of man can imitate. If there was in nature but one kind of sugar, the number of choice delicacies in our gardens and fruit orchards would be lamentably small.

But nature does not, in the bestowal of her fruits, spontaneously, or of her own free will, sweeten them for us so acceptably. What are designed to be luxuries and the most highly prized forms of food, she ordains shall be bestowed only through the exercise of labor, care, and skill, on the part of man. No one of the fruits in its wild or native state holds any considerable quantity of sugar of any kind, — not enough to make it acceptable to the taste, or fit it to serve as food. It is only by skilful cultivation, by hybridizing, by budding and grafting, that we have secured the sweet principle in fruits. We have, as it were, educated the dumb chemists in the vegetable cell, and fitted them for the work which nature made them competent to perform under man's guidance.

It is indeed wonderful that we can increase or diminish the amount of sugar in any kind of fruit or plant by cultivation. The beet, for example, under ordinary care, will afford from four to six per cent of sugar; but, by scientific and generous culture, the percentage can be nearly or quite doubled. I have succeeded in increasing the sweet principle in apples, grapes, and peaches, by cultivation and proper fertilization, and this, when the principle was originally present in normal quantity. In increasing the sugar, we also increase every other desirable quality in the fruit; for one principle cannot be forced into prominence without being accompanied by all the others.

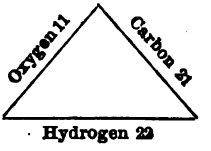
I will now endeavor to explain by the aid of chemical symbols the nature of the different sugars, and also show the nature of the sweet principle of some fruits. In the arrangement of symbols, table No. 1, I bring to view the atomic constitution of a molecule of sucrose or cane sugar; also that of starch, and the necessary changes to convert starch into sugar.

Table No. 1.

Sucrose	C_{12}	H_{22}	O_{11}
Aqua	H_2	O	
Starch	C_6	H_{10}	O_5
Multiply by			2
	C_{12}	H_{20}	O_{10}
Add		H_2	O
Sucrose	C_{12}	H_{22}	O_{11}

Table No. 2.

Glucose	C_6	H_{12}	O_6
Multiply by			2
	C_{12}	H_{24}	O_{12}
Subtract		H_2	O
Sugar	C_{12}	H_{22}	O_{11}



Alcohol	C_2	H_6	O

Table No. 3.

HOW FRUITS ARE SWEETENED.

	Cane Sugar.	Grape Sugar.
Strawberries	6.87	4.98
Peaches	2.10	3.17
Pears	62	8.42
Oranges	4.22	4.36
Grapes (Black Hamburg)	00	17.26
do. (Concord)	00	14.08
do. (Green)	00	1.60
Melons (Water)	8.17	00
do. (Musk)	9.02	00

Dextrose	C_6	H_{12}	O_6
Levulose	C_6	H_{12}	O_6
Fruit Sugar	C_6	H_{12}	O_6

A molecule of common water is represented thus, $H_2 O$, which means that it is composed of two atoms of hydrogen and one of oxygen. Now to form sugar out of starch we must double the molecule, and this we do by multiplying the starch molecule by two, but this does not give us sugar; it is necessary to add a molecule of water, which gives us in the diagram, sugar, as shown by comparing the resultant line of notation with the upper.

In table No. 2 is shown the composition of grape sugar or glucose, and also how it must be modified so as to change it into cane sugar. We must first double the molecule as is shown, and then *subtract* one molecule of water, and this gives us cane sugar, $C_{12} H_{22} O_{11}$. In the triangle is presented a hypothetical molecule of cane sugar, composed of its constituent atoms, Oxygen, Hydrogen, and Carbon. It is apparent that a substance so constituted must be in a condition of unstable equilibrium, for there is constant tendency to change and form new compounds. Sugar is a substance very easily decomposed, and by the application of heat, a large number of new compounds result. One of these new bodies is alcohol, which is represented by the formula

$$C_2 H_6 O.$$

An examination of the diagrams will show you how starch is converted into glucose. Starch has the formula as shown,

$$C_6 H_{10} O_5.$$

Now if we add to a molecule one molecule of water $H_2 O$, we have glucose,

$$C_6 H_{12} O_6,$$

and this is all that is necessary to convert the starch of corn or potatoes into the sweet principle of grapes.

We cannot convert starch into cane sugar, because we cannot double the size of the molecule and force into combination one more molecule of water. If we could accomplish this result, all our crystallizable cane sugar would be made in the laboratory, and the growth of sugar cane, beets, etc., would cease, as the artificial process would supply sugar at cheaper rates.

We can make grape sugar out of starch, because we have discovered a method of forcing one more molecule of water into combination with it, and this gives us glucose.

Table No. 3 explains how several kinds of fruits are sweetened. The percentage of cane sugar and fruit sugars which enters

into strawberries, peaches, pears, etc., is shown. It will be noticed that in grapes no cane sugar is presented; the sweet principle is entirely glucose. Of course fruits vary greatly in the amount of sugar they contain. These examples are presented as the results of analysis made with the view of obtaining general or approximative results. Whilst it is possible to increase the saccharine principle, and also to modify the hydrated malic acid constituent in fruits, it is entirely beyond our power to change the fixed nature of vines, shrubs, and trees by any methods of cultivation or fertilization yet discovered. I know of nothing more wonderful in nature than the persistency with which vegetable structures adhere to their original bent or design. Trees producing sour apples, pears, peaches, or vines producing astringent grapes, cannot be turned aside from their laboratory work, unless by the introduction of scions, or the employment of the knife in other ways.

We all know that two trees growing side by side, from the same soil, breathing the same air, and precisely alike in external and internal structure, will grow fruit totally dissimilar in chemical constituents and physical appearance. If a young sour apple tree is cut off low in its trunk, and scions of another kind inserted, it is changed only above the point where they are placed. The chemical reactions below continue true to their original instinct, and if fruit comes from a sprout it is charged with the acid juices of the parent tree.

We thus have the bewildering fact brought before us that sap circulating through one portion of a tree culminates in the production of excess of acid in the fruit; while in another there is found an excess of sugar. It is not unusual to observe a newly set scion bud, blossom, and bear fruit the first year. The apple may weigh ten times as much as the frail scion which held it up, and supplied the nutriment necessary for its growth, but the little twig transplanted to an alien limb, will set up a laboratory of its own, and from the strange juices brought to it, will manufacture fruit entirely dissimilar to its companion fruits growing in close proximity. An example of this nature was afforded in my orchard, when from a scion having a surface for cell action of only nine square inches, a sweet apple was grown weighing seven ounces, and affording from its juices ninety-three grains of fruit sugar.

We have, however, still more wonderful examples of fruit chemistry in apples which in their own structure exhibit sectional differences of composition, one-half or one-quarter being saccharine, the other portions being extremely acid, and having the sectional lines distinctly drawn. I have seen a basket of this remarkable fruit in which the divisions were in all proportions, but each one unmistakably marked.

I have brought to view these interesting examples of plant chemistry, not with the supposition that they are new to you, but simply to awaken inquiry and stimulate research, that we may, if possible, obtain new light upon some most perplexing problems.

The sap of plants, which is largely water, may have but little agency in influencing those changes which result in the production of the sweet principle in fruits. Cell action, controlled by the actinic solar ray, is unquestionably the source or active agent in the chemical changes which accompany vegetable life. The vast volume of water, which in the form of sap courses through our fruit trees, cannot, however, be lightly regarded. It brings to the cells the elements and molecules of inorganic material, which enter into the reactions involved in plant chemistry; and, it is only through the sap that we can beneficially influence the products of our orchards and vineyards. It is probable that we do not often stop to consider the immense preponderance of water in our fruits, which is shown by analysis.

Several years ago, I made analysis of several varieties of apples, with the view of determining their exact food value. Among them were the Tolman's Sweet, Hubbardston, and Baldwin.

The apples selected were in different stages of ripeness, the Hubbardston being more advanced than the others. Very important modifications are produced by the chemical changes in apples as they approach the stage of maturity, or the period when they become mellow and ready for the table. The amount of sugar increases, and the hydrated malic acid decreases, or disappears altogether in some fruits. The cell walls of the structure become softened, and readily break down; oxidation begins at any point where imperfection or abrasions in the skin occur. The amount of nutritive material is to some extent increased in ripe apples, and they are much more easily digested and assimilated by men and animals.

The results of the analysis, were as follows:

Hubbardstons.	
Water,	88.57
Albuminoids, pectose gum, and sugar,	11.27
Ash,	0.16
	100.00

Tolman's Sweets.	
Water,	83.29
Albuminoids, sugar, pectose gum, etc.,	16.54
Ash,	0.17
	100.00

The unripe Baldwins gave 87 per cent water, with a less amount of albuminoids and sugar than the others, and considerable free hydrated malic acid. The sugar varied from about 5 per cent. in the Baldwins to 9 per cent. in the Sweets. The total insoluble matters, including skin, seeds, pectine, ash, etc., averaged about 3.25 per cent.

These results show how largely preponderating in apples is the water, which in amount is about 85 per cent. of their weight. Therefore, a tree bearing 30 bushels (46 pounds to the bushel), holds up in the fruit about *half a ton* of water. The nutritive value of apples, is, of course, not in the water, but in the solids,—albuminoids, sugar, and gum. In a bushel of Hubbardstons, there is about six pounds of soluble nutritive material at the period of ripening; in Tolman's Sweets, about seven pounds; in Baldwins, five pounds; and this material will vary to a considerable extent in value. Sugar is a carbonaceous substance, and nutritive in a certain direction. It is mainly useful as fuel, and by oxidation serves to maintain animal warmth. The albuminoids are nitrogenous and therefore are foods proper; the gum is also a food.

The albuminoids are seldom found above half of one per cent. in any varieties, and this would give us less than four ounces in the bushel; of sugar, we find in a bushel about two and a half pounds in acid fruits, and considerably more in sweet.

The analysis of apples as presented, shows that the amount of nutriment, or absolute food they contain, in proportion to bulk, is small. This research extended over considerable ground, much of which is not pertinent to this discussion. I will simply say that, as regards apples as food for animals, my practical experience in

feeding them confirms the results of analysis. They are of *some* value, and when fed in connection with meal, serve to give zest to the appetite and keep animals in health. The riper the apples the better the results, and they should not be fed in a half-frozen state to milch cows, as this course will invariably cut short the milk supply. If they are cooked by boiling, their value is much enhanced, as more perfect digestion results.

In the cultivation of fruits, we should not be misled by the fact that they do not, in themselves, exhaust soils, except in a slight degree. The constituent principles of fruits are, to a large extent, organic, and, therefore, derivable from water and the atmosphere. Sugar, the important principle of all fruits, takes nothing from the soil which has money value. The albuminoids, as has been shown, are very sparsely distributed through most of our fruits, and as they hold the nitrogenous element, it is seen that nitrogenous manures are not needed in large quantities in orchards or fruit gardens. Analysis of the grape shows that in most varieties nitrogen, as supplied in manures, is not necessary. The results of analysis in the case of all fruits, have been satisfactorily confirmed in my practical experience.

I have never found nitrogenous manures to exert marked specific influence upon any of my fruit crops, and years ago I discontinued their use. Fruit trees, shrubs, and vines need nitrogen, but the spontaneous supply in soils is fully equal to the comparatively small amounts required. There is one mineral element which may be said to be the pabulum *par excellence* of growing fruits, and that is potash. It is certainly true that we cannot raise perfect and desirable fruits if we withhold this element from the soils of our orchards. When it is considered that we influence growing fruits only through the act of rendering the tree or vine vigorous and healthy, and when we further consider how much potash is required to maintain a normal condition in large fruit trees, which are constantly under the pruning saw and knife, we obtain some correct views of the importance of this agent in soils. Both the fruit of the vine, and the vine itself, are great consumers of potash. The same may be said of most of our small or soft fruits.

It is not usually advisable to attempt to reclaim and render productive a worn out grape border, but if any satisfactory success is attainable, it is only through a plentiful supply of good wood ashes and bone meal.

Twenty years ago, I discovered that it was best, in preparing borders for cold grape houses, to use plenty of wood ashes, and to place the fertilizing materials in successive thin layers, rather than in the usual form of a mixed heap. I have one border prepared in this way which is made up of sixty alternating strata of different fertilizing substances, and they have remained undisturbed for twenty years. The fruit product from this border has been uniformly excellent in quantity and quality, from year to year, and renewal has not been necessary.

My view is, that the subterranean feeders of the vine will follow what may be designated as vegetable instinct in procuring food, going no further for it than is necessary. If we place phosphoric acid, lime, potash, and nitrogenous salts in distinct layers, each resting upon one of good soil, we place our vine roots, as it were, at a table spread with many dishes, and unerring instinct will guide in selecting what is needed to keep the vine and fruit in the best possible condition.

The saccharine qualities of the Black Hamburg and Frontignan varieties, are greatly improved by having at hand plentiful supplies of potash; and wood ashes is the best possible source for this alkali. The German chlorides are next to be preferred, but they do not, in vineyards, meet the desirable results supplied by ashes.

The ordinary German Kainit, as found in commerce, I class among the poisons in the list of assumed vegetable foods. I have never failed to observe injurious results in the use of these salts on my farm. Common salt is not a manure, and we may as well so decide once for all.

After an experience of nearly a quarter of a century in conducting an experimental farm, I have reached the conclusion that the growth of our fruits, and most of our cereal crops, is best promoted by the use of a fertilizing mixture, made up of finely ground fresh bones and good wood ashes. This mixture I arranged and recommended twenty years ago, and I find after persistent soil experiments, extending over many years, that I am using it more freely than ever.

My method of preparing it is, to take six barrels of pure raw bone flour, and twelve of good wood ashes, and mix them well together upon a shed floor, adding, during the mixing, twenty buckets of water and one barrel of gypsum or plaster. This mixture may be allowed to stand a few weeks, or it may be used at

once if needed. If permitted to stand long, it heats from chemical action, and the freed ammonia is in part fixed as a sulphate by the plaster, but not all of it.

For fruits of every kind I know of no better fertilizing material, and as it supplies every needed element of nutrition, its effects are remarkably persistent and immediate.

But, gentlemen, I must detain you no longer. I cannot think that I have presented anything new, or of special value to a company so intelligent and experienced as this. There are old facts, and forms of knowledge which it is well to call up for consideration occasionally, as we often find that the good and excellent have been neglected because they are old.

Dr. Nichols added, in further explanation of the chemical composition of sugar, that it is a compound of pure water with carbon —absolutely pure water with the elements of a diamond. It is a very unstable compound; when placed over the flame of a lamp the water escapes, and the carbon is brought to view. A molecule of sugar is like a watch spring wound up; the struggle between the chemical forces is towards change into lower combinations. A potato is but a mass of starch, and can be changed almost entirely into sugar. The change of starch into sugar requires the presence of diastase, which is a starch solvent apparently provided for a specific purpose. Sugar cane, a few weeks before it is ripe, has no sugar; after it is mature it has no starch, and the case is the same with most fruits. The production of sugar is not exhaustive to the soil; the refuse from the manufacture of beet sugar returns to the soil all inorganic substances taken from it. In strawberries there are three kinds of sugar, two of which are uncrystallizable and one crystallizable. Most pears contain uncrystallizable sugar. The orange will grow in sand with the addition of potash and lime. The Black Hamburg grape, when ripe, has about seventeen per cent of glucose, and its juices are most agreeable though we cannot tell precisely why. Changes in fruits go on with great rapidity at the time of ripening. Beet sugar is as sweet as cane sugar. The chemical composition of milk sugar is the same as that of cane sugar, but it has only one-third of its sweetening power. We have in the sugars interesting examples of isomerism; bodies, so far as we can distinguish, constituted alike chemically, but having very unlike physical properties.

Dr. Nichols also stated that wood ashes are often adulterated; he bought one lot from Canada which contained by analysis nine per cent of potash, but the next lot had less than four per cent. He regarded the discovery of the Stassfurth potash salts as providential; the supply is enormous, millions of pounds being produced each year. In kainit there is so large a proportion of common salt that it is apt to kill grass. The chlorides of potash may be mixed with phosphates and nitrate of soda and extended with humus, so as to form composts closely resembling stable manure, in concentrated form. The Stassfurth salts are now brought to this country and used by official analysis made at the salt mines, and these determinations are usually safe and reliable.

Discussion.

Leander Wetherell said that the lecturer had stated that salt is in no sense a manure. This the speaker doubted, but while he did not deny it he stated his observation as follows: A farmer in Ware, whose farm is contiguous to the right bank of Ware river, has raised winter rye on a piece of light soil for ten years, more or less, using no stable manure, but has applied annually a top-dressing of common salt of an inferior grade, called "refuse salt," purchased in Boston for that special purpose. He sowed it on, mixed with a little plaster, broadcast at the rate of three bushels per acre. Visiting this farmer annually the opportunity for careful observation for years was enjoyed. The crop of rye was heavy and the straw was clean and white when the crop had ripened; the grain was of superior quality and the annual yield was good. The lecturer was asked by Mr. Wetherell to explain this phenomenal observation in growing winter rye upon thin soil, very poor in humus. Similar experiments were made by a farmer in Hardwick on a farm also contiguous to the right bank of Ware river, not only with winter rye but other farm crops, where salt produced marked effects as a "fertilizer," as he called it.

Dr. Nichols said that we cannot obtain uniform results on all soils. The Ware farmer obtained his crops independently of the action of the salt. There are many farmers in Massachusetts who raise good rye crops on light silicious soils for many consecutive years, without the use of a spoonful of salt or any fertilizer. Too much attention is given to apparent variations in known or fixed

principles. Too much time is taken up in farmers' meetings in discussing trivial and imperfectly conducted crop experiments. The principles of agriculture should be studied.

George F. H. Markoe said that he had seen raisins containing crystallized glucose, and specimens of beautifully crystallized anhydrous glucose which were manufactured in this country, and which is now being produced in a large way under a patented process. The glucose of the market is generally impure, but any pure glucose can be crystallized from its alcoholic solution.

Dr. Nichols said that the glucose of dried raisins is never crystalline, but by evaporation of water amorphous lumps are formed which the gentleman had mistaken for crystalline bodies. He had seen the most recent imported specimens of glucose, but none of them were crystalline. No one has yet succeeded in crystallizing glucose in a practical way.

Hon. Marshall P. Wilder said that he was delighted with Dr. Nichols's lecture; he spoke of what he knew, and there is no man better capable of instructing us. The facts given by him in regard to the use of ashes and bone dust are extremely valuable, and he advised all the cultivators present to get all they can. Sugar of different kinds is one of the most healthy substances. It is possible to produce sugar on our own soil. It has been stated that sorghum sugar cannot be crystallized, but it is now a settled fact that it can be, and wherever sorghum will ripen its seed, sugar can be made. The seed is worth nearly as much as corn, and the refuse of the stalks is valuable for the food of animals and the manufacture of paper.

Professor Markoe said that all chemical action is a series of substitutions, in which might makes right, or the stronger agent replaces the weaker one. The action of caustic lime liberates ammonia gas from ammoniacal salts. If sulphate of ammonia is mixed with caustic lime, the ammonia is liberated, and sulphate of lime is formed. Sulphuric acid added to fertilizers will fix the ammonia. The so-called rectified guano contains sulphuric acid, which has been added in quantity sufficient to transform most of the ammonia into sulphate of ammonia.

Dr. Nichols said that not until lately had he been able to purchase the Charleston phosphate nodules ground fine enough for making fertilizers, but now an impalpable powder can be obtained, and he had used it with considerable success. It makes a low-

priced, good fertilizer. The value of nitrogenous manures is unsettled, and he thought we had considerable to unlearn, especially in regard to animal substances holding potential nitrogen. He thought dried blood and animal tissues of uncertain value, and that further study and long-continued soil experiments are needed to settle their value on a reliable basis.

President Hayes spoke of Dr. Nichols's paper as most interesting, especially his description of the little graft as a factory working out the processes of nature. The lecture was as eloquent and powerful as any sermon, and he wished thousands could have heard it. He was also glad to hear from Professor Markoe, and to have these two chemists bring the latest results of their science before the Society, and it was pleasing to see the kindness between them, as evinced by the reception accorded by each to the different views of the other. In behalf of the Society, the President returned grateful thanks to Dr. Nichols for his interesting, eloquent, and instructive address.

BUSINESS MEETING.

SATURDAY, February 10, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President read an invitation from the Imperial Russian Horticultural Society, to attend and contribute to the International Exposition of Horticulture and Congress of Botanists and Horticulturists, to be holden at St. Petersburg, May 17–28, 1884, in celebration of the twenty-fifth anniversary of that Society.

Hon. Marshall P. Wilder moved that a delegation be appointed by the Chair to attend the Exposition and Congress, with power to appoint substitutes. The motion was carried, and the Chair appointed Mr. Wilder, E. W. Wood, and William H. Spooner delegates.

The Secretary read a letter from Francis Darwin, Cambridge, England, expressing thanks, in behalf of the family, for the testi-

monial to the memory of his father, Charles Darwin, adopted by the Society at the meeting on the 30th of December, 1882.

Adjourned to Saturday, February 17.

MEETING FOR DISCUSSION.

The Best List of Old and New Herbaceous Perennials for General Cultivation; also, Notes on Rare Herbaceous Plants Difficult to Cultivate, and on Improvement in our Native Herbaceous Perennials.

By Warren H. Manning, Reading.

In presenting this subject for discussion, I will reserve the List of Plants for the close; and, in opening, will make some mention of the Cultivation of New and Rare Plants.

It is always safe to follow, as nearly as possible, the conditions in which a plant flourishes naturally, unless a better method of cultivation is known. In case neither is known, one may be guided to a great extent by the appearance of the plant, which is very often an indication of the soil it grew in, and may give it the treatment that has been given successfully to similar plants. An aquatic or bog plant can usually be distinguished by its large cells and soft, fleshy stems and leaves; a plant growing on dry, sandy or gravelly soil by the dry, harsh feeling of the stems and leaves, or the large, deep growing tap root. Alpines and rock plants are generally small and dwarfed, and often fleshy, with long and fine hair-like roots; frequently from a short rootstalk or tap-root.

There are, of course, many exceptions to these observations, but any cultivator of herbaceous plants, or observer of plants in their native homes, well knows that alpine plants are quite different in appearance, as a class, from bog plants, and bog plants from those growing in sand or gravel. The lines are very often quite clearly marked between whole families of plants, and it is often a good way of determining the habit of a plant to find in what family it belongs. For example, the hardy North American representatives of the Orchid family nearly all grow in moist, shady situations in woods or meadows, in a peaty or leaf-mould soil; the Pink family

in dry, well drained, light soils; the Composite, Mint, and Pea families, with few exceptions, in any good soil; and the Iris family in wet, boggy situations.

Those plants that will adapt themselves to nearly all conditions are, of course, easy to cultivate; it is those requiring special conditions for success that we shall have the trouble with, and the Alpine plants, as a class, contain the greater number of these; but they are very beautiful, and well repay all trouble spent on them to secure success. This success must be gained by patience and perseverance under repeated failures.

In England, gardeners said that Alpine plants could not be grown in the open ground; Mr. Robinson believed any of the hardy ones could be grown if proper methods were used, and he tried their cultivation. His book on "Alpine Flowers" will show his success.

But we must not try to grow the same or similar plants by his treatment, although we may get many useful hints from it, for our climate is quite different from that of England; they do not have our scorching summer sun, nor do they have the frequent and sudden changes from the freezing temperature of night, to a hot, burning sun in the morning, without a veil of mist to modify its fierceness, which is so destructive to our herbaceous plants. We cannot depend on the rockery as they can. Mr. Falconer, of the Botanic Garden at Cambridge, who has had great experience with herbaceous plants, both in England and in this country, says that most Alpine plants that he has grown here do much better in the open border than in the rockery. They must not be in such a position as to allow the water to settle about them, and it is best to mulch them with stones to keep the soil about the roots moist and at an even temperature.

Neither can we depend on England or Europe for Alpine plants that will succeed under the conditions presented here. We have our own White, Alleghany, and Rocky Mountains to draw supplies from, and any traveller in these mountains will testify to the beauty of the Alpine flora. You will very likely say that these plants cannot be obtained; but I have no doubt that those who have a large collection of herbaceous plants for sale, and who have correspondence with collectors in all parts of the country, will get them when there is a demand for them.

These difficult classes of plants must be taken in hand by some

amateur who has a sufficient love for the work, and sufficient interest in the results to be gained, to carry his experiments to a successful issue. Those in the nursery business, as a usual thing, can only grow such as sell readily at a profit.

The above remarks on the treatment of Alpines will also apply, so far as the water settling about the plants is concerned, to succulents, such as Sedums and Sempervivums, which are also Alpines, for if it does, it will rot the plant; but they will grow in very poor, dry soil, or on rocks in most barren and unpromising spots. In fact, these are some of the most available and successful plants for covering our rockeries.

Sand plants will, as a usual thing, do much better on their own soil than in a richer loam; for if the soil is rich, they are liable to make a strong growth of foliage at the expense of the flowers, and the plant is very likely to be killed by the first hard frost, while, if it were grown in a poor, sandy soil, it would blossom freely, ripen its growth early, and withstand frost.

If a plant is not successful in one spot, move it to another; it is surprising to see what a little difference in soil or position will do for a plant. Often a position where no perceptible difference from the former locality is to be seen will make all the difference between success and failure.

Most of our native plants are improved by removing them to cultivated ground, where they are protected from the inroads of stronger growing plants or weeds, that would kill them out under the same conditions of soil in a wild state. Take, for example, the Trilliums, which will make fine, large clumps in the garden, while in the native woods they are seldom found with more than a single bulb in a place. The Jack in the Pulpit is greatly improved in the size of the plant, leaf, and flower. *Aquilegia Canadensis*, or wild Columbine, cannot be excelled in habit of plant, and beauty and abundance of flowers by any other cultivated Aquilegia. *Lobelia cardinalis*, or Cardinal flower, flourishes finely in all good garden soils. The Wild Calla, Lizard's Tail, and many others, are greatly improved by being cultivated. When established in cultivation, these and others should be improved by the same arts of horticulture as have brought the beautiful Phloxes, Larkspurs, and Hollyhocks to their present perfection.

In making a list of the most desirable herbaceous perennials for general cultivation, we must see that there is a sufficient variety

in color and in the flowers at all seasons; also, we should choose plants of good habit of growth, and thoroughly tested. It would be impossible to give a list that would be best for all localities, but a list of such plants as are really desirable in the ordinary flower garden would be useful to those wishing to make a selection. Many of the plants named, such as Tulips, Phloxes, Pæonies and Hollyhocks, are worthy of exclusive attention, and it would be a source of much pleasure and instruction for any one to experiment with a certain flower, in connection with his general collection; to make it a specialty, and improve it and its varieties as much as possible by hybridizing, selecting improved seedlings, and propagating sports; but if one did not wish to do this, a few of the choicest and most select varieties should be chosen to represent it.

I hope the remarks and suggestions made in this paper, and also the list of plants, will be thoroughly discussed by those present. Fifty more equally desirable plants might be added to the list, but I will not run the risk of making it too long.

Spring Flowering Plants.

Adonis vernalis,
Allium Moly,
Anemone Pulsatilla,
Aquilegia Canadensis,
Bulbocodium vernum,
Convallaria majalis,
Crocuses in variety,
Dicentra eximia,
Dicentra (Dielytra) spectabilis,
Dodecatheon Meadia,
Erythronium Americanum,
Iberis sempervirens,
Mertensia Virginica,
Phlox reptans,
" subulata, and varieties,
Polemonium reptans,
Scilla Sibirica,
Tulips in variety,
Viola pedata, and varieties.

Summer Flowering Plants.

Achillea Ptarmica fl. pl.,
Aquilegia cærulea,
" chrysantha,
Asclepias tuberosa,
Campanula Carpatica,
Centranthus ruber, and varieties.
Coreopsis lancolata,
Delphiniums in variety,
Gypsophila paniculata,
Hemerocallis graminea,
Iris Germanica, and varieties,
Platycodon grandiflorum, and varieties,
Pyrethrum roseum, and varieties,
Spiræa Filipendula,
Iris Kæmpferi, and varieties,

Lilium auratum,
" candidum,
" elegans *var.* incomparabile,
" superbum;
Lobelia cardinalis,
Lychnis chalcedonica, and varieties,
Lychnis diurna fl. pl.,
Pæonies in variety,
Papaver orientale,
Phlox decussata, and varieties,
Spiræa lobata,
Ranunculus acris, fl. pl.,
Veronica amethystina.

Autumn Flowering Plants.

Aconitum Japonicum,
Anemone Japonica,
Cassia Marilandica,
Funkia Japonica variegata,
" subcordata,
Gentiana Andrewsii,
Helianthus orgyalis.
" decapetalus,
Hibiscus flavescens,
" Moscheutos,
Lilium speciosum, and varieties,
Rudbeckia nitida.

Discussion.

Dr. Henry P. Walcott was called on, and said that the only class of hardy herbaceous plants that he had cultivated were the native Orchids, with which he was quite successful in an artificial bog in a brick tank. The Oregon variety of *Calypso borealis* had flowered two years, growing in living sphagnum. *Habenaria ciliaris* also flourished. *Rhexia Virginica* grew so vigorously as to become a perfect weed, and had to be taken out, but it is so beautiful that he will prepare a separate bed for it.

Mr. Manning said that the hardy Orchids are very interesting, but not suited to general cultivation. In the Botanic Garden at Cambridge, the Cypripediums are successfully cultivated. *Liparis liliifolia* has improved under cultivation, having several more flower buds than when growing wild. A friend has a border of *Viola pedata* to his garden path, which blossoms twice a year.

Edward L. Beard said that the Narcissus is one of the most neglected plants. *Narcissus poeticus* is generally badly grown; it wants thorough care and cultivation, and will repay it. A friend of his had a large ravine running through his estate, with bare and unsightly sides, and Mr. Beard suggested to him that he should make pockets in the sides and fill with soil and plant narcissuses, and along the sides of the brook which ran through the ravine,

similar bulbs. He planted two thousand bulbs there, and was highly pleased with his success. The double *Narcissus poeticus* has a tendency to drop its buds; which is caused by leaving the plants, as is generally done, until the soil becomes exhausted. Constant feeding, and occasional shifting into new locations must be attended to. He had been very successful by giving fresh soil, and had produced astounding development. The long tubed species of *Narcissus bicolor*, of which the Emperor and Empress are two of the finest varieties, amply respond to any care given them. They are quite hardy; the speaker grows them on top of a clay bed. They do not seed, but increase from offsets. Some of the varieties will not grow here, but there is an ample list that will. The Lily of the Valley, also, is generally left to take care of itself, but if they are transplanted, and the soil is replenished, they will give astounding results. The same mistake is made with many herbaceous plants. The new Double Pyrethrums are most desirable; they require good culture and division of the roots. Some herbaceous plants will live along without much care, but the finer kinds require as much as a bed of roses. The general tendency is to neglect them. The speaker is very fond of Delphiniums. In England, the beautiful *Iris Kœmpferi* dies out, but it is constant here, particularly in damp localities. The *Anemone Japonica*, of which he prefers the white variety, may be placed in the foreground of useful plants.

Hon. Marshall P. Wilder spoke of the old hardy perennial double Candytuft as having been so neglected, that ten or fifteen years ago it was introduced as new, and sold for a dollar a plant. It is very desirable.

Mrs. H. L. T. Wolcott said that she lost all her narcissus buds for several years, and in despair she took them up and reset them, and last year every bud gave a flower. The idea that herbaceous plants can be neglected is incorrect. Eternal vigilance is the price of a garden as well as of liberty, to which, in the case of the garden, must be added fertilizers.

Dr. Walcott said there is one plant, the Fraxinella, which will flourish, year after year, without removal. He has them fifteen or sixteen years old, and he knows a plant seventy-five years old which flourishes as well as ever. It is the typical hardy perennial.

Mr. Wilder spoke of the *Spiræa Sinensis* (known, also, as *Spiræa*, *Astilbe*, or *Hoteia Japonica*,) as one of the most beautiful

herbaceous plants. It forces admirably. The Tree Pæonies are superb; Elizabetha, which he introduced twenty-three years ago, at a cost of three hundred francs for the first plant, and which is still rare, is one of the finest varieties. The tree pæony is slow of propagation, and, therefore, the new kinds are very dear. Nothing is more gorgeous than pæonies, either tree or herbaceous, but lately they have been much neglected. If the old dark crimson variety were now introduced as new, nothing would be thought to surpass it. The speaker believed it would be well for the Society to offer premiums for hunting up the good old things that have been passed by.

Mrs. Wolcott thought that if it is the intent of the Society to promote horticulture among the masses, it should encourage the cultivation of easily grown and cheap things, like the fraxinella, which, however, she had tried over and over again without success. She asked this in behalf of the community generally. She was led to speak of this point by the interest she felt in window gardening, and by her knowledge of the inability of many, who would like to cultivate flowers, to pay more than a very small sum for plants. Plants to be freely cultivated, must be sold at prices within the reach of the people. The tree pæony is, virtually, out of the reach of people generally.

Mr. Beard thought Mrs. Wolcott had not given her fraxinella a suitable soil, and advised her to try another.

Mrs. Wolcott replied that she had tried every soil.

Mr. Beard thought that it likes a clay soil. He planted it in such soil five years ago, and it has thriven. He acknowledged that he had not lived up to his own theory of good cultivation, in connection with this plant, which had been left to take care of itself with good results.

Mrs. Wolcott thought that knowledge must be added to eternal vigilance and fertilizers, for success in gardening. She dug up a large clump of fraxinella with a pick-axe and transplanted it, hoping from its age and size to secure a plant, but was unsuccessful.

C. M. Hovey said that the fraxinella is somewhat difficult to increase. It has very strong, woody roots, with few fibres, and it takes some time to get established. It is very beautiful but cannot become common. The *Asclepias tuberosa*, or Butterfly Weed, he had known since he was a boy, and he esteemed it the most beauti-

ful of all our native perennial plants. It resembles the fraxinella in the character of the roots and the difficulty of transplanting. At the South Shore he saw clumps as large as a bushel basket along the sides of the roads, and some varieties darker than usual. He tried to dig up some roots with a trowel, but found it impossible. He finally succeeded in digging up a few roots, which were like parsnips, but nearly all grew. It makes no offsets, and the best way to propagate it is to sow the seed where the plant is to stand. It has been cultivated by only two or three individuals.

The herbaceous pæony is everybody's flower. It has been improved by English, French, and American cultivators; it is easily grown, not difficult to increase, and forms a show not surpassed in the flower garden. Many of the varieties are quite fragrant, and some are desirable for that quality. Tree pæonies are now comparatively cheap; plants which would formerly have cost from five to ten dollars, can now be bought for from a dollar to a dollar and a half. Only a few new species of herbaceous plants have been introduced in the last forty or fifty years. The Delphinium has been much improved; some of the new kinds are apt to die off, but such is not the case with some of the old ones like *Delphinium formosum* and the Bee Larkspurs; you can hardly kill them. Some of the old kinds are very stately in growth. We are going back to the cultivation of the dahlia, which went out of fashion some years ago; it is now coming up in the single form. We have been surfeited with double flowers; single tulips are much more admired than double, but double stocks are better than single.

Mr. Wilder agreed with Mr. Hovey as to the importance of restoring the cultivation of the pæony. It seeds freely and is easily cross-fertilized, and everybody can have them. Some of John Richardson's seedlings are equal to any that have been raised.

Mr. Beard spoke of the Everlasting Pea as one of the most beautiful and useful plants in the flower garden. It will scramble over anything, but rocks or a low trellis are best. If the seed pods are removed it will bloom continuously. There are three varieties, the rose colored, pure white, and striped. Like the fraxinella it forms immense underground roots, and wants to be put where it can be undisturbed. It is very useful for cutting. The Gloxinia is not a hardy plant, but he was induced to speak of

it because he saw it grown out doors last summer in a cold frame, and forming a most beautiful sight. The tubers were planted in the spring and the glass was shaded. The flowers come on stout stalks, and are most useful for cutting. The bulbs are easily wintered by storing them in sand, in a temperature of from fifty to fifty-five degrees. In the spring they must be started in the house and afterwards planted in the frame. The plan has been tried in England, but there they are generally coddled till the rust to which they are subject gets on them. The frame which he saw full of these gloxinias was fifty feet long, and was a sight to behold. The sashes were slightly tilted up, and the glass was whitewashed. The bulbs were planted in the ground.

President Hayes said that nothing could be more beautiful than the gloxinia. He had imported bulbs from England, and would try the method of cultivating in frames recommended by Mr. Beard.

Mr. Wilder said that a new class had been introduced called *crassifolia;* it is more robust and has larger flowers. There is no end to the number of varieties that can be raised of the gloxinia tribe.

Mr. Hovey advised the trial of Achimenes and Tuberous Rooted Begonias in frames, like the gloxinias, which Mr. Beard had spoken of. Some of the tuberous rooted begonias do well in the open air, but the flowers of the choicer varieties are so delicate that they do better in frames. The hardier varieties are very desirable and beautiful if treated like the gladiolus; they grow freely and bloom up to frost.

Mr. Wilder said he had seeds of tuberous rooted begonias then coming up. In England, Mr. Laing has 150,000 seedlings. There they surpass the scarlet geraniums for bedding.

Mr. Beard said that tuberous rooted begonia seed is very deceptive; like primula seed, four-fifths of it is apt to be chaff. He paid half a guinea for twelve primula seeds, and got one good seed out of the twelve. The inside of the pod of the begonia breaks up into chaff. Except in extraordinarily hot summers, the tuberous rooted begonia is one of the best bedding plants. He has five hundred seedlings stored away. The light colored varieties stand the sun better than the dark. They do better in partial shade out-doors than under glass. He stuck down branches in the beds to shade the plants. The double ones, with a little care, will

stand the sun, and are not so apt to drop their flowers as the single. They are very deceptive when raised from cuttings; they will go along through the summer, and in autumn no bulb is to be found; only a few roots have been sent out. A shoot which has a growing eye should be used for a cutting; it will not succeed with only a flower bud. He does not shorten the leaf when he plants the cutting.

President Hayes spoke of the difficulty of procuring good seed of improved varieties of flowers. He had seed of *Humea elegans* from which he got not a single plant. He had found seed from Dippe Brothers, of Quedlinburg, Prussia, very satisfactory.

J. W. Manning said that there is much unexplored territory where new species may yet be collected. He never saw such Aquilegias as in the Rocky Mountains, at an altitude of twelve thousand feet. There were other flowers entirely new to him, that were as showy as gloxinias. The atmosphere was so rare that walking was very exhausting there.

E. H. Hitchings spoke of a plant of *Lilium Canadensis*, with fifty-seven flowers, found in Lynn, by a friend. He recommended the cultivation of the native climbing plants, such as *Clematis Virginiana*, *Mikania scandens*, and *Apios tuberosa*.

Warren H. Manning said that the *Apios tuberosa* must be grown in moist soil, as the tubers frequently decay in dry soil. When it thrives, it is apt to become a weed. The *Iris Kæmpferi* is grown by the Chinese in ground flooded once a year. It wants care, and blooms better after dividing.

The subject for the next Saturday was announced as "New and Useful Shrubs, and the Best Method of Propagating," to be opened by William C. Strong.

BUSINESS MEETING.

SATURDAY, February 17, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Benjamin G. Smith, Chairman of the Committee on Publication and Discussion, stated that a desire had been expressed by persons

residing too far away to avail themselves of the other advantages of this Society, to purchase its publications, and moved that the subject be referred to the Executive Committee. The motion was carried.

Adjourned to Saturday, February 24.

MEETING FOR DISCUSSION.

New and Useful Shrubs and the Best Method of Propagating.

By William C. Strong, Newton Highlands.

In accepting the invitation of your Committee to open this subject of "New Shrubs and How to Propagate Them," I had no idea of the dilemma into which I was led, upon neither of whose projecting horns do I wish to impale myself. In the first place I have no disposition to cry up a list of novelties after the fashion of venders of new strawberries, new roses, new grapes and what not, which are being let out with a bang so loud that, in the recoil, the innocent public finds relief in the fact that nothing but smoke is left behind. I am not to be caught naming this and that new and marvellous shrub which, beyond question, is destined to do much towards transforming our gardens into a paradise, while at the moment I utter this prophecy I can notice the sly insinuation going round the room that "probably he has a large stock of that particular variety, all ready to place upon the market." Not into that trap do I put my foot.

Withdrawing from this horn with some little complacency, I turn to mention some kinds which I cannot possibly be able to offer for sale for at least a few months, and consequently concerning which I have no selfish and prejudiced motive, and, proceeding to dilate upon their extraordinary merits, I am about to make use of a great number of superlative terms, when I notice a queer kind of smile playing upon the countenances of some of our enterprising cultivators, and an occasional wink shooting across the room, and, if my ears did not greatly deceive me I caught a nurseryman's whisper that he catalogued that identical variety more than six months ago. Dropping this kind as speedily as I may, without too great betrayal of embarrassment, I turn to name, with

some confidence, another kind which has given me particular pleasure, enhanced, no doubt, by the thought that no one in this country, except myself, has ever beheld its marvellous beauty, when the first mention of its name is met with a loud guffaw, and the quick remark that that variety was discovered a score of years ago, and was even mentioned by Loudon, though subsequently it was lost. Mr. President, there are no new shrubs, they have all been let out; you have them; our ex-presidents of course have them; the ladies and gentlemen have all got them; we are even on this score and there will be no occasion to raise a laugh at our mutual expense.

Having thus effectually opened the subject, as requested, showing that, with the exception of artificial hybrids in the hands of the originator, there are no new shrubs, it will of course be pertinent to conclude with a few wise directions how to propagate them. First, *get* them, is a rule that will occur to the feeblest understanding. But before entering further upon this part of the subject I will name some shrubs which are not new, but which have merits that entitle them to be more generally cultivated than they now are. It will also be proper to mention the defects of some kinds, which are likely to limit their culture.

The Japan Maples of the *polymorphum* type, may be properly classed as shrubs — at least, in this country, it does not seem probable that they will exceed the usual limit of size of shrubs. There can be but one opinion as to the exceeding beauty of many of these forms. The variety known as *atro-sanguineum*, to which is added *purpureum* (as if the little plant were not already crushed to the earth by the weight of its name), is perhaps the best of all for our climate. But it is greatly to be feared that none of these are likely to prove vigorous. Probably they are hardy enough to endure the cold of our winters, provided they mature a healthy summer growth. The difficulty is with our hot, dry sun. On the estate of Mr. Hunnewell, where they have the benefit of shelter and moisture, they seem to thrive, and are superlatively beautiful. But, on the other hand, it is significant that in the nursery of the Messrs. Parsons, where the stock has been largely propagated for years, we do not find the plants get beyond the frames, into the open ground, to any extent. The general experience is, that they will require such careful nursing as will unfit them for common use.

An Azalea, also from Japan, called *mollis*, might also have been

called new some half dozen years ago, at least on this side of the water. But that has gone by, though the variety remains in its glory, and I am glad to modify my opinion that it was not hardy enough for open culture. Mr. Jackson Dawson informs me that it endures the climate at the Arnold Arboretum quite as well as the Ghent varieties, and flowers superbly. The Arboretum has a large number of seedlings raised on the grounds, from which we may expect plants every way adapted to our climate. This class is a very important acquisition, and will be likely, if further trial shall prove it to be hardy, to supersede the Ghent type, which, though fine in colors, has not the size and form of flower of the *mollis* type.

Still another Japan shrub is the Red Bud (*Cercis Japonica*), which differs from our American Red Bud or Judas Tree, in being very much more dwarf, assuming a bush form, and flowering profusely when less than one foot in height. Its tendency is to spread, and I should judge it would never attain a height exceeding a few feet. Its flowers are much larger and richer in color than those of *C. Canadensis*. The specimen which I exhibit was cut from a bush planted in the greenhouse six weeks ago, and is not, therefore, a fair example.

While we are upon Japan, I will mention the large class of evergreen shrubs, known as Retinosporas, or Japan Cypresses. Many varieties of this family are quite hardy in this section, if planted in soils and positions adapted to their wants. The old heath-leaved variety (*ericoides*) is not hardy with me, but *plumosa*, *plumosa aurea*, *squarrosa*, *filifera*, *obtusa*, *obtusa nana*, and *lycopodioides* have all endured exposed positions in my grounds. Though very diverse in form and foliage, they are of great importance for lawn decoration. Probably the golden *plumosa* and the silvery and dewy *squarrosa* would be singled out as most useful and contrasting.

Two years ago I had a row of Tamarix from this same Island of Japan, called *plumosa*. It seemed to me more hardy, and certainly was more erect and plume-like, and richer in foliage than the well-known Indian, African, and German Tamarixes. It so took the eye of one of our prominent landscape gardeners, that he secured the entire row before I knew what he was doing. I have recently learned from him that he lost the entire lot the first winter after planting. I do not regard this as a fair test, how-

ever, since we remember the killing effect of the early October freeze of that year, which was so destructive to many newly planted shrubs, though quite hardy.

Rosa rugosa, from Japan, a recent introduction, gives several shades of color in flowers, the dark red, called *rubra*, being, perhaps, the best. It is a large single flower, of much beauty when partly open, but the bush has great merit as a shrub, with dark, rich green foliage, very luxuriant in appearance, and crowned in winter with numerous scarlet seed vessels. It is a real acquisition.

I do not propose to take you around the globe and dwell as long in each country as we have in Japan. But suppose we take a single specimen from the inhospitable soil of Siberia, called *Cornus Sibirica foliis albo-marginatis*. This is undoubtedly a variety of the Siberian Cornus, but it may well be doubted whether the sport first occurred in its native habitat. It is probably a garden variety. At any rate, the variegation is very distinct light, with shades of pink in clear contrast with vigorous green, giving a lively appearance to the bush, which is very attractive. It is not as strong in growth as *Cornus sanguinea*, but is still vigorous, and has the same scarlet wood for fine winter effect. I regard it as a very promising shrub.

A new Plum from Persia, called *Prunus Pissardi*, has attracted a good deal of attention at French exhibitions during the past season. It is said to have "splendid foliage of a blood scarlet color, keeping so until the leaves fall down in November, the wood being of a brilliant black color." This is the description given by the introducer, who assures us "this is the finest novelty ever introduced, since a long time." I have not seen the variety, but the awards which it has obtained would indicate that it is worthy of trial. In habit it is said to resemble *Prunus triloba**.

In a row of Silver Bells (*Halesia tetraptera*) I noticed last summer a single plant, about three feet in height, which was as golden in color as the freshest piece from the mint. Of course it was conspicuous as far as it could be seen. I watched it with great interest. In September, I looked for it and it was gone. If I had it today, Mr. President, I would present it as the one specimen of a new shrub. But I fear it will be kept from public view; it is so distinct that it would betray the thief as certainly as a bank check.

* Specimens planted this season give promise that the description will be realized.

I do not regard the Weigelas with special favor, but the variety *candida* is pure white, and a decided improvement on the straggling growth of *hortensis nivea*, and a real acquisition.

Spiræa Thunbergii deserves general cultivation, because of its graceful habit and foliage, which is pretty enough for bouquets and table decoration. It bears a profusion of delicate white flowers which are the first of the season. *Spiraea ariæfolia* is the most profuse flowering.

The Golden Elder is the most effective plant of this color.

The Purple Hazel is a strong contrast in dark color.

The Cut-Leaved Sumach (*Rhus laciniata*) contrasts strongly in its airy, fern-like leaves, which are very beautiful.

The Variegated Althæa is perhaps the best plant with white foliage. It is vigorous and striking.

Of the light, breezy, snowy-white *Exochorda grandiflora*, mention has frequently been made in our discussions, but not more so than the plant deserves. The same may be said of *Viburnum plicatum*.

The panicled species of Hydrangea is more upright in growth, and of better foliage than *Hydrangea paniculata grandiflora*. Many will also prefer the light trusses of bloom to the grosser masses of *grandiflora*. It is a question of taste, about which we may not dispute.

These varieties are named because they are of comparatively recent introduction, or have special merit and deserve a more extended cultivation. It is quite beyond our scope to allude to such old but admirable kinds as our native *Kalmia latifolia* and *Magnolia glauca*.

But I must not weary you with a longer list of favorites, although no mention has been made of dwarf species, Arbor Vitæs, and other evergreen shrubs of great value for lawn planting. We have a wealth of material, and with the aid of the knife we may increase the dwarf varieties almost without limit. For example, what tropical palm-like luxuriance may be produced by cutting the Ailanthus to the ground and securing new shoots every year or two. The Purple Beech is fine in color when kept as a shrub. Schwedler's and Reitenbach's Maples must be even better than the beech for this purpose.

A few words as to propagating.

The natural method is by seed, and it is the cheapest; but it is

also the slowest. Where we have plants that bear seed, and can give the time, we sow the seed. But if we are in haste with a new kind, grafting upon strong, congenial stocks gives a great gain in time. The rarest evergreens are multiplied with great facility and very quickly by this process. It is only necessary to start the stocks in pots, and when the sap is fairly moving, to side-graft the dormant scion, and then pack away in a shaded frame in the greenhouse, kept well moistened with sphagnum, and in a few weeks a skilful workman will show you a large per cent of well established plants. The grafting of deciduous shrubs is seldom practiced. They are oftener propagated from soft wood cuttings, taken in July and August, when the wood is in a half mature state. The cuttings are put into boxes having two or three inches of soil at the bottom, and a covering of one to two inches of fine sand at the top. In close, shaded frames, having a slight bottom heat, the cuttings will root freely, and be strong enough to pack away during the winter. The next spring they should be planted out, and will make stocky plants by autumn. A cheaper mode, and one which is effectual for many shrubs, is to cut the hard wood into proper lengths in the fall, then bury it in a dry soil in the open ground in bundles, bottom ends upward, then cover with boards to keep from severe freezing and thawing, and also to shed the rain. In the early spring plant firmly in carefully prepared garden soil. Of most varieties, a large per cent will make vigorous growth.

For those who cultivate plants in greenhouses, the easiest method is to take cuttings in February, March, and April, of the soft wood. These root readily in an ordinary propagating bed, and are ready to be turned out into the open ground in May to make strong plants by fall. Those who raise roses for winter cut flowers, find this last mode the most satisfactory. I have just been trying an experiment in feeding cuttings with a solution of cow manure, just as the callus is formed, and I am convinced that it induces the throwing out of strong, healthy roots, of more substance than we can get in pure sand.

May I say a few words in conclusion in favor of a more general use of shrubs for the adornment of suburban homes? They are peculiarly adapted to give the best effects at the least cost, and with permanent results. There is no danger that they will grow up to overshadow, and shut out air and sunlight and open views from our dwellings. Many of the coarser growing kinds are not

in keeping with our modern highly cultivated estates, and are to be relegated to the less conspicuous positions, for screens and wind-breaks. But there is left a long list of varieties, in all respects suited to the most cultivated positions, and one difficulty will be in making judicious selections. However much we may prize the flowering quality of shrubs, yet we are to remember that the flowers last, in most cases, only for a week or ten days in the year, and we desire something more than this brief enjoyment.

It is true that we have some shrubs which flower at periods of scarcity, like the Clethra and Hydrangeas in August, and the Althæas in September, and which would, therefore, be indispensable for that quality alone. The rose is also an example of such superlative excellence in bloom, that it can well afford to stake its reputation upon this one point. Still it remains true as a rule that we must seek for effect in form and in grace and luxuriance of foliage, as giving more enjoyment in the aggregate than the brief period of flowering. We must study to harmonize and heighten the effect of colors, of form, and of size. We have a greatly increased range of colors, from the white of the Cornus and the Althæa, the golden of the Elder and the Spiræa, the evergreen of the Retinospora, Arbor Vitæ, and Yew, and the vivid green of the Forsythia, to the dark shades of the Berberry and Hazel. What combinations of light and shade may be made with these materials! Again, we have great variety in size, and character of growth, from the softness of the most delicate evergreens to the rugose vigor of the Japan Rose. What combinations, what striking effects may be produced when these are used in harmony with each other, and with their surroundings! Judicious planting is a great art, but it is an art which insures a great and permanent reward.

Discussion.

Charles M. Hovey, while agreeing generally with the essayist, differed from him in his estimate of the Weigelas. It is true that there is a sameness about them and that they are not equal to some other shrubs, but they are easily grown and cultivated. They are old, having been among the early introductions by Mr. Fortune. The Exochorda was introduced soon after, but is but little known. This and the *Viburnum plicatum* and *V. macrocephalum* were the results of Mr. Fortune's mission. The Japan Cercis is new and

most desirable for the size of the flowers and the dwarf habit. The essayist was right in his remark that the Retinosporas are one of the most beautiful classes of shrubs. It was well said by the late Henry Winthrop Sargent, that the time has gone by for Norway spruces and trees of similar growth, and that for lots of from a quarter or half an acre to an acre we must come to shrubs, which take but little room and do not crowd and shade. The flowers of the *Forsythia suspensa* are of a brilliant yellow, and appear very early in the season. With the aid of a knife the plants may be kept quite dwarf, or they may be grown into beautiful weeping standards. The Ailanthus may be made very effective in small grounds by cutting down the old growth and training up a single sucker. The leaves are almost as beautiful as those of palm trees. The lilacs are valuable for their dwarf habit. *Magnolia Halleana* is very desirable, as is also a black variety called *M. nigra*. There are many good old shrubs which we should not neglect, and new ones which have no particular value. The essayist has given us much valuable information in regard to propagation, but Mr. Hovey was surprised that he did not mention layers. The Exochorda may be propagated by cuttings of the soft wood and layers of the older wood. Modern invention has brought out many new methods of propagation. The Tree Pæonies were very slow in propagating, and consequently very high priced, until it was discovered that they could be grafted on the roots of the herbaceous species.

Jackson Dawson, gardener to the Arnold Arboretum, read the following list of new shrubs, with comments and descriptions.

Clematis coccinea is a herbaceous climber, growing from four to six feet high, and has small, very pretty, scarlet flowers, blooming all summer. It is perfectly hardy.

Clematis Davidiana is a beautiful suffruticose plant, with flowers of a porcelain blue, borne in clusters, from the middle of July to September, or later. Propagated by root cuttings.

Clematis graveolens is a very rapid growing woody climber, with light yellow flowers in August, followed by beautiful silvery winged fruit.

Clematis Pitcheri is a North American species, with pretty purple flowers, appearing from June to frost. This and the preceding species are easily propagated by seed, which they produce freely.

Magnolia stellata or *Halleana*, from Japan, grows two feet high, and flowers almost as soon as the snow is gone. It is propagated

by seed or layers, or by grafting on *M. acuminata*. It seems to be perfectly hardy.

Magnolia Thurberi has not yet flowered at the Arboretum, but will probably prove one of the most desirable varieties as to habit, which is neat and compact.

Magnolia Soulangeana var. *nigra* is a new variety, with very deep colored flowers.

Berberis Neubertii Hort. is one of the most promising shrubs as regards foliage, which is large and glaucous green.

Berberis Thunbergii has beautiful foliage, especially in autumn. The fruit is brilliant scarlet, and hangs on all winter, but is not edible. It seldom exceeds two feet in height. It is propagated by cuttings and seed.

Berberis Sinensis, recommended two years ago, has confirmed the opinion then expressed that it is one of the most desirable shrubs of its kind.

A Berberis sent as *Fortunei* is handsome in flower and foliage. It grows two feet high.

Hypericum Kalmianum, *H. prolificum*, and *H. aureum* (the last from the Mississippi), all have yellow flowers and bloom in the order named; the first, at the end of June, continuing through July. *H. aureum* produces its large yellow flowers until frost, and is the finest of all the Hypericums.

Hibiscus Syriacus variegatus. For a silver variegated leaf, this is one of the finest of all plants, and stands the summer sun without the slightest injury. Propagated by cuttings of hard or soft wood.

Actinidia polygama is a vigorous climber from Japan. The young shoots are of a pale brownish red, prettily speckled with ash colored dots. The flowers, in general appearance, resemble those of the pear. It is well adapted for covering an arbor.

Stuartia pentagyna is an old shrub, found in Virginia, flowering in June and July. The flowers are pure white, and resemble those of the Single White camellia, to which it is allied. It is propagated by seeds, cuttings, and layers, but is very difficult, and of slow growth.

Vitis (*Ampelopsis*) *heterophylla* is a very ornamental climber, especially in autumn, when it is covered with its fruit, which is yellow, white, purple, and blue.

Euonymus nanus is a pretty little dwarf evergreen, of very dense growth. It has scarlet fruit, about midsummer, similar to that of

the other species. It may be grafted standard high, or may be propagated by cuttings.

Euonymus alatus (the Wing-Barked Euonymus) is a small shrub with red berries, propagated by cuttings.

Euonymus verrucosus is a very neat dwarf shrub, with warty bark (as the name signifies), and bright red fruit.

Staphylea Colchica is tender at first, but hardy after a few years. It is propagated by cuttings of the young wood, or by layers.

Æsculus macrostachya (Dwarf Horse Chestnut) is a low growing species, with long spikes of pure white flowers, which are very effective. It blooms about midsummer. It may be propagated by seed or grafting.

Cytisus purpureus, is an old and valuable dwarf shrub, with purple and white flowers, appearing early in spring.

Cytisus nigricans has bright lemon colored flowers in summer. A very desirable small shrub, never exceeding a foot or a foot and a half in height.

Halimodendron argenteum blooms the last of June, and the flowers resemble those of the purple Cytisus. It does best grafted on Caragana, as it is rather a weak grower on its own root. The plant is similar to the Caragana, but the leaves are more silvery.

Amorpha canescens, or Lead Plant, is a very pretty native of Missouri, about two feet high at the most. Leaves downy; flowers deep purple, in long spikes, appearing about midsummer. Well worthy of cultivation.

Lespedeza bicolor is probably from Northern Asia. It blooms in June and July, and the flowers resemble those of the Cercis. It is perfectly hardy, but very difficult to propagate by cuttings.

Caragana arborescens (Siberian Pea Tree) grows from six to eight feet high, and has foliage similar to that of an acacia. In early summer it is covered with its yellow pea-shaped flowers. It is best propagated by seed.

Caragana frutescens var. *grandiflora* is propagated by root cuttings, but would make a better plant grafted on *C. arborescens*. The flowers are of a lighter yellow, and larger and more showy than those of *C. arborescens*.

Caragana spinosa is a curious species.

Robinia hispida, when grafted on *R. Pseud-Acacia*, grows more vigorously, does not throw up suckers, and flowers two or three times in the summer.

Dolichos Japonicus kills to the ground. It is a rapid climber.

Prunus pumila is found wild on our hill-sides. In cultivation it makes one of the neatest shrubs—prettier than *Deutzia gracilis*. It grows from a foot to three feet in height, and the flowers are white.

Prunus Japonica alba plena is old, but valuable. It does best grafted on the plum. The flowers are similar to those of the flowering almond, but snowy white.

Cerasus Watereri grows from six to eight feet high, and has very large double flowers, an inch and a half in diameter. It is the finest of all the double flowering cherries, and is propagated by either grafting or budding on the common cherry.

Spiræa millefolia is entirely new to cultivation. It was found in the dry districts of Nevada, and proves perfectly hardy. It grows three feet high and flowers in July and August; the individual flowers are half an inch across, white, and borne in spikes. Propagated by cuttings of the new wood.

Spiræa hypericifolia. The foliage is very pretty, having a glaucous tinge all through the summer. It is more desirable for the foliage than for the flowers.

Spiræa Thunbergii is well known, and now mentioned merely as one of the good things.

Spiræa betulæfolia is from California. It has pure white flowers in large round heads, the last half of May. It is propagated by cuttings.

Spiræa confusa var. *mollis* is the earliest of all the species. It is very free flowering; the flowers are white, with a slight tinge of yellow.

Spiræa Douglassii var. *Nobleana* has very large spikes of purple flowers, about the middle of June.

Spiræa Van Houtteii is a variety of *S. Fortunei*. It has very rich colored foliage, and fine, pearly-white flowers. It does not make a large plant, but is one of the best.

Spiræa salicifolia var. *Bethlehemensis* has deep rose-colored flowers in spikes like those of the type, from the middle of June to the first of August.

Spiræa salicifolia var. *Billardieri* is possibly an improved variety of *S. Douglassii*, with much more showy flowers.

Spiræa callosa var. *semperflorens* has flowers smaller and lighter colored than those of the type, and they continue nearly a month longer. They are borne in umbels.

Spiræa callosa var. *alba* is not as vigorous a grower as *S. callosa*, of which it is a white variety.

Neillia Amurensis is a vigorous growing shrub from Northern Asia, resembling *Spiræa opulifolia*, but the flowers are three weeks earlier, and much finer.

Exochorda grandiflora is well known as one of the finest shrubs, and one of the hardest to propagate.

Potentilla Salesovii is a shrubby cinquefoil, growing two feet high. It has large white flowers, and is propagated by cuttings.

Rubus deliciosus is from the Rocky Mountains. The flowers are pure white, of the size of an ordinary single white rose, and very showy. It may be propagated by seed, cuttings of the hard wood, or root cuttings.

Rosa rugosa alba is pure white, pretty, and desirable. The foliage takes a handsome color in autumn.

Rosa alpina glandulosa is the earliest of all the wild roses, flowering at the end of May, and a very desirable species. The wood is almost wholly free from thorns.

Rosa rubrifolia has rich deep purple foliage the whole season through, which, with its beautiful flowers, makes it a very desirable species. It is very difficult to propagate.

Rosa multiflora is one of the neatest of the wild roses, with pure white flowers, which have yellow stamens. It flowers from the first to the tenth of June. The fruit is ornamental, and hangs on all winter, giving it a very pleasing appearance.

Rosa setigera, one of the latest blooming of all the native roses, produces large clusters of light pink blossoms, and is very showy. It is probably the parent of the climbing Prairie roses of the gardens.

Rosa alba is one of the finest and purest of all the large white roses.

Rosa blanda var. *scropularia* is from the Rocky Mountains, and was received from Dr. Engelmann, the discoverer. It is very beautiful in bloom, and the fruit is perfectly magnificent — more beautiful than that of any other rose.

Rosa foliolosa has very light colored large flowers. It is dwarf, growing only a foot high, and the latest flowering of all the genus, blooming into July.

Amelanchier Canadensis (Shad-Bush or June-Berry) is one of the most beautiful native shrubs; it has snow-white flowers in June.

Amelanchier vulgaris (European) is a very pretty dwarf-growing species, quite similar to our *A. Canadensis.*

Amelanchier Asiatica is almost pendulous, and perfectly hardy.

Amelanchier alnifolia, from the Western States, grows from one to three feet high, and has very pretty white flowers and purple fruit.

Amelanchier—species from the mountains of Japan—is a very neat growing shrub and perfectly hardy, but has not yet flowered.

Malus Japonica (*M. Toringo* of some botanists) has semi-double flowers, appearing the last of May. They come out crimson, and change to rich rosy pink. This is one of the most desirable shrubs for a moderate-sized place. It may be budded or grafted.

Cydonia Japonica nivalis is a new, white flowering variety of the common Japan Quince. The flowers are large and pure white, and it is one of the finest additions to the varieties of this beautiful shrub.

Cydonia (*Pirus*) *Maulei* is a new species here. It has brick-colored flowers appearing with those of *C. Japonica;* smaller, but much more numerous. A very desirable shrub.

Ribes saxatile, from Northern Asia, has yellow flowers, and later is covered with rich orange and red berries. It is best propagated by hard wood cuttings.

Philadelphus hirsutus is a very pretty native species, well worthy of attention. It is dwarf in comparison with *P. grandiflorus*, etc. The shoots are slender and droop over, and are covered with pure white flowers, which appear about the first of July. It is best raised from cuttings.

Philadephus variegatus is one of the neatest of the white variegated plants, and stands the summer well. Of very slow growth.

Philadelphus grandiflorus is known by every one.

Philadelphus microphylla, a native of Colorado, grows one foot high and has small foliage, one tenth of the ordinary size. It is a perfect little gem.

Philadelphus coronarius Schrenkiana, from Northern Asia, is one of the earliest varieties, and a dwarf growing kind.

Deutzia parviflora is from Northern China and Japan. The flowers are pure white, in umbels; they appear a week or ten days earlier than those of *D. gracilis*, and last till that is out of bloom.

Aralia Chinensis (*A. cordata*) has leaves almost as large as palm leaves, and would produce a sub-tropical effect. It is propagated by root cuttings.

Aralia pentaphylla is good. It is shrubby, with leaves as brilliant as those of the holly, but deciduous. Propagated by cuttings.

Cornus florida pendula forms a small tree, and will be desirable if it proves hardy here, which is somewhat doubtful, it being a more southern form than the type. It may be grafted or budded.

Cornus Sibirica. The great beauty of this species is in the wood, which is of vermilion color, and brightest in the coldest weather. It is easily propagated by hard wood cuttings.

Cornus brachypoda is a new Japanese species, which has not yet flowered, but is said to be very fine. The foliage and growth are somewhat similar to that of our *Cornus alternifolia.* It is propagated by cuttings or grafts.

Lonicera hispida is a very neat, low-growing shrub, with very pretty purple flowers, which appear in spring.

Lonicera Merrowii, from Japan, is similar to *L. Tartarica.* It is beautiful in both fruit and flower, bearing a profusion of berries, which hang on until September.

Lonicera Maximowiczii is probably an Asiatic species. It has pretty purple flowers, and fruit of a brilliant, glossy red, like that of a red currant. It is very difficult to propagate.

Viburnum Japonicum has large, leathery foliage; the leaves are from four to six inches in length. It has not flowered yet, but the foliage is very beautiful, and it is perfectly hardy.

Viburnum plicatum is too well known to need description. It has been considered difficult to propagate, but cuttings of soft wood, put in in July or August, under glass, root as easily as any shrub.

Viburnum macrocephalum has very handsome white flowers. It grows from three to five feet high, and is free flowering and very showy. Propagated by cuttings or grafts.

Viburnum rotundifolium resembles *V. plicatum*, but is very dwarf, and the leaves are smaller and not downy underneath like those of *plicatum.* The flowers are as white, and in similar heads, but earlier and smaller. From Japan, and hardy.

Viburnum Lantana, a European species, called there the Wayfaring Tree, has been so long known here as hardly to need description. Soft, woolly leaves; white flowers in spring followed by black fruit. It is worthy of more general cultivation than it has received.

Viburnum lantanoides, known also as Moosewood, is one of our

handsomest native shrubs, with very large round leaves and pure white flowers. The fruit is brilliant red at first, turning to dark purple or black. The autumn foliage is very rich. It is seldom seen in cultivation, but ought to be.

Viburnum prunifolium is a very pretty native species, well worthy of cultivation. The same may be said of *V. dentatum*, *V. nudum*, and *V. lentago*.

Viburnum Opulus nana is probably a dwarf variety of the common Snowball, and is a very low, compact growing shrub, not exceeding a foot in height. It is very desirable for an edging, or wherever a low shrub is needed.

Erica carnea, grows less than a foot high, and is one of the hardiest of all the Ericas. It flowers early in the spring, as soon as the snow leaves the ground. There is also a variety *alba*.

Andromeda polifolia is a very pretty glaucous leaved shrub, a native of Massachusetts and northward. The flowers are pink, changing to white, and produced in May.

Andromeda Japonica is a lovely evergreen, but wants to flower too early, and should be shaded.

Oxydendrum arboreum flowers in August and September. It is difficult to propagate. The foliage turns to a beautiful purple in autumn.

Kalmia latifolia and *K. angustifolia* flower in June and July. They are well known as beautiful native shrubs, which ought to be in every collection.

Rhododendron Catawbiense. In June, the top of Rown mountain, in North Carolina, is covered, by hundreds of acres, with this beautiful shrub, like one vast flower garden.

Rhododendron maximum is our well-known hardy species, and the latest flowering — almost a month later than the others. A vigorous grower, with pale pink flowers.

Rhododendron punctatum is a very pretty little species from the Western territories. The flowers are deep rosy pink, with dark purple or maroon spots. It is not quite so hardy as the other species.

Azalea nudiflora is a native species, with very pretty, fragrant pink flowers, produced in May.

Azalea viscosa is another well-known native species, with very fragrant white flowers in July.

Azalea calendulacea is a native of the Middle and Southern

States. The flowers vary from pink to yellow in many shades. They appear in June.

Azalea arborescens is from North Carolina, and grows from fifteen to twenty feet high. The flowers are almost pure white, with scarlet stamens, and come after those of all the other species are gone.

Azalea mollis is one of the finest and hardiest of all the species. The flowers, which are in all shades, from salmon to yellow, are very nearly equal to those of the Indian azaleas.

Ledum latifolium grows a foot and a half high, and flowers in May. It is found in the mountain regions of the Northern States. It is a very pretty shrub, with pure white flowers.

Clethra alnifolia, our native species, is well known, and easy to handle.

Clethra Japonica has not flowered, but is said to be better than the above. It is difficult to propagate.

Styrax Japonica flowers very freely in June and July. The flowers are pure white, and resemble small Halesia flowers. It is propagated by cuttings of the young wood. At the Arboretum it has winter-killed somewhat; but at the Botanic Garden, in Cambridge, it stands perfectly.

Symplocos sp. is from the mountains of Japan. It has very fine sprays of white flowers, and is perfectly hardy.

Lycium Chinensis has fine berries, which hang on after the frost has killed the leaves. They are larger and more showy than those of the European species.

Forsythia suspensa, when trained in tree form, with the head drooping, is one of the most beautiful objects in the garden in early spring. It is easily propagated by hard or green wood cuttings.

Syringa Sinensis alba is a very pretty early white flowering variety, from China.

Syringa ligustrina, from the mountains near Pekin, China, has not yet flowered, but promises well.

Syringa pubescens, grows from a foot to a foot and a half high, and has white flowers and fine large leaves, which, with its very dwarf habit, make it a plant of great promise.

Syringa ovata, has not yet flowered, but the appearance of the plant is grand; leaves large, heart-shaped, with a bright, rich, glossy surface, and holding on through the summer.

Syringa sp. The seed was brought by President Clark, of the Massachusetts Agricultural College, from Japan. The plants are eight feet high, and still growing vigorously, and are of fine form and habit and promise to make small trees. They bear large spikes of white flowers after the other lilacs, even the Josika, are gone.

Ligustrum Ibota, or Japanese Privet, is a dwarf shrub, probably never exceeding three or four feet in height. It bears pretty little white flowers, almost completely covering the bush in July; the spikes are drooping instead of erect. It is entirely distinct from all the other privets.

Daphne Mezereum, though an old plant, is seldom seen. It blooms soon after the snow is gone, and the pink flowers are succeeded by pretty berries, which must not be eaten, as they are poisonous. There is a variety with white flowers, and also a double white. It is propagated by seeds or root cuttings.

Eleagnus argentea grows from three to four feet high, and has silvery foliage. It is well known to be dicœcious, and to have fruit both sexes must be planted. It is very hard to propagate, but root cuttings are best.

Eleagnus longipes flowers in May. The fruit is orange colored, and very agreeable to the taste. It is sold in the markets of Japan.

Mr. Dawson concluded with the remark that among our own native shrubs are varieties more worthy than two-thirds of those imported.

Hon. Marshall P. Wilder said that Mr. Strong's paper and Mr. Dawson's list, afford more information on hardy shrubs than has ever been presented at any other meeting. He had endeavored to keep abreast of the age in this as in other respects, but, like Mr. Hovey, was surprised at Mr. Strong's low estimate of the Weigela. He thought it would be hard to fill its place in our shrubberies. The variety with variegated foliage is far more beautiful than the variegated Althæa, and is never injured. He asked whether the Paulownia did not transcend the Ailanthus in beauty when headed down every year or two, as advised for the Ailanthus.

Mr. Strong thought that our climate would not allow us to cultivate the Paulownia as recommended for the Ailanthus, though it might do. There are two or three varieties of variegated Althæas, one of which is more beautiful than the variegated Wiegela. He

did not speak of layering as a method of propagating shrubs, because that, as a rule, it is not suitable for them, being apt to make one-sided plants, but it is well adapted to propagating vines. The Stuartia is not hardy with him.

Mr. Dawson said that he had cultivated the Stuartia in the open nursery without protection, and had seen it on a gravel knoll at Mr. Parkman's, and on the edge of an azalea border, and never winter-killed.

Mr. Hovey said that the Stuartia is hardy with him.

Mr. Wilder's experience with the Stuartia was like Mr. Strong's; he had got plants several feet high, but never could make it flower. The Paulownia dies down, but sends up magnificent shoots; he had had one fourteen feet high. He had had the *Azalea mollis* for twelve or fifteen years, and it is as hardy as his pear trees. It is a magnificent acquisition, with its vivid orange and yellow flowers. He has crossed it with the Chinese species, and the seedlings have stood out for two years. The *Magnolia Halleana*, with double white flowers, is a very fine acquisition. Nothing eclipses the *Hydrangea paniculata grandiflora;* he cut the flowers before frost and put them in water for a few days, and they were as handsome at the time of speaking as when cut; it is an everlasting flower. He advised to hold fast to the good things, new or old.

Mr. Dawson said that there are two species of Stuartia; the *Virginica* is tender, while the *pentagyna* is hardy.

Col. Henry W. Wilson thought the directions given in regard to propagating, both valuable and interesting, as teaching people how to get shrubs easily. We are in danger of overlooking our native shrubs, such as the beautiful Kalmia. Every one can have a border of native shrubs. The High Bush Blueberry is easily cultivated, and beautiful both in spring and autumn. He has a plant eight feet high, which is a mass of fruit in its season, and supplies his family with more than all they want. It combines utility with beauty.

Benjamin G. Smith said that he has a hedge of the high blueberry, which is one of the most interesting features of his garden. The plants were removed from the borders of Fresh Pond to the most elevated location in Cambridge. He gives them an annual dressing of peat.

Mr. Wilder said that the high bush blueberry wants a good deal of water.

such an institution as the Agricultural College he had no superior, and his loss to it is an irreparable one. He had visited our rooms and expressed deep interest in the welfare and progress of the Society. The motion was carried, and the Chair appointed Mr. Wilder, William C. Strong and John B. Moore, a committee to prepare memorial resolutions.

Adjourned to Saturday, March 3.

MEETING FOR DISCUSSION.

The Cultivation of Hardy Grapes.

William H. Hunt, who had been appointed to lead the discussion, said that twenty-five years ago we should hardly have thought of discussing the subject. Then no cultivation of hardy grapes existed. The only variety grown was the Isabella, and no one thought of cultivating it on an extensive scale, and no one had any faith in it. Mr. E. W. Bull, by raising the Concord, proved that it was possible to improve the wild varieties, and make cultivation profitable. The Concord was only one step in improvement, but certainly a very wonderful step. Mr. Bull's success led others to attempt the improvement of the grape, and the number of varieties now introduced is very great, and there seems to be no limit to the possible improvement.

The grape is one of the most healthful, as well as delicious fruits. Every one can eat them; and, in Germany, grape cures have been established for invalids. Our chief fruit crop is the apple, but it bears only once in two years, while the grape bears every year, with seldom a failure. The speaker had been growing grapes for twenty years, and never had any vines killed except in one year, when he lost as many pitch pines, and he had failed of a crop but one year, when he had half a ton instead of five tons. He had cut down vines and cultivated four or five years, and still the roots threw up shoots. Grape vines do not require rich meadows, but can be grown on poor hill-sides and other land not adapted to general farming.

Guyot states that the colonizing power of the grape is three times greater than that of wheat. On poor lands he estimates the annual product of a farm in grain and pasture at $20 per acre per

year, and of vineyards at from $48 to $192. In Champagne, the average yield is 290 gallons, worth 50 cents per gallon, or $145 per acre. The same land in grain would yield but $22. The average profit is about $60 per acre for the best wines, and $30 for those of second quality. If we go into the cultivation of grapes in this country, we can produce an immense quantity. The number of acres in vineyards in Europe, in 1878, was 14,000,000, producing 22,832,000 tons of grapes, and 3,806,200,000 gallons of wine (or 272 gallons per acre), worth, at 25 cents per gallon, $951,300,000. In France, there were 5,500,000 acres of vineyards, producing 9,000,000 tons of grapes, and 1,505,000,000 gallons of wine, worth $376,000,000. The population of France is 38,000,000, so that there were nearly 500 pounds of grapes to each inhabitant. The product of wheat was 229,000,000 bushels. In the same year, the United States produced 1,378,000,000 bushels of corn, worth $441,000,000; 448,000,000 bushels of wheat, worth $326,000,000; 5,500,000 bales of cotton, worth $200,000,000, and 30,000,000 gallons of wine, of which 10,000,000 gallons were produced in California. The population of the United States is 50,000,000, and the area 3,000,000 square miles. The size of France is 206,474 square miles. The area of Texas is greater than that of France; and California contains more acres suited to the cultivation of the grape than France. Grapes require a large amount of labor which never can be done by machinery, but can be performed by women and children.

Mr. Hunt next considered whether the cultivation of the grape can be made profitable in Massachusetts, and thought that it could be if properly attended to, with sufficient knowledge. The grape will survive neglect, but it does not pay to neglect it. If a vineyard cannot be properly cared for, it would be better to cut it down. Grapes want a dry soil, and an elevated situation should always be chosen for a vineyard. The ground should be properly prepared by ploughing thoroughly, but not very deeply. It should be furrowed out where the vines are to be planted, to save the expense of digging holes. The distance apart of the vines depends on the system of training and pruning to be adopted. If they are to be trained to stakes, they should be eight feet apart; if a trellis is used, the rows should be ten feet apart, and the vines six feet in the rows. On stakes, two arms are trained, and they are pruned on the spur system. On trellises, both the spur and renewal system are used. The system is not of the first importance; the vine

will accommodate itself to any. The grower should know how much fruit and foliage to retain. Overcropping must especially be avoided, and one can only learn by experience how much fruit a vine will carry. This is a matter of the first importance; for if a vine is overtasked, it is not only weakened for future years, but the excessive crop will be late in ripening. In California, the main cane is grown three or four feet in height, and no stake or trellis is used, but the shoots are allowed to hang down. In Italy, vines are allowed to run on trees; chestnut trees are planted for this purpose, and when they have grown to a large size, canes twenty feet long will run from one tree to another. In Germany, the bow system is used. Every section has a different system. That pursued by Dr. Fisher, of Fitchburg, who has been very successful in the cultivation of the native grape, is being introduced. This is the renewal system, where a cane which has fruited is cut off in the fall, and replaced by one which has been grown for that purpose. The speaker has used stakes with two shoots coiled around them. In this method great care is required to prevent too much growth at the top. Other crops can be grown between the vines for two years, during which time but few grapes can be expected, but after that time the roots will be well established, and no other crop should be grown on the land, but thorough and clean cultivation should be practised. The speaker prunes at any time in the winter, and had also pruned without injury when the vines bled. He had tried them without pruning for one year. Summer pruning or pinching the young shoots is important to restrain the growth of the vine, and prevent it from running to wood at the expense of the fruit. Only experience will tell how much to take off in pruning.

There is a great difference of opinion in Europe in regard to the use of manure for vines. Guyot states that in some of the best wine districts they are afraid to use stable manure, lest it should injure the quality of the wine, and that, where it is necessary, it is put on after the vintage. At Thomery, where the best table grapes are produced, the vines are manured liberally every three years. At Johannisberg, cow manure is used freely, and the director thinks that it improves the quality of the wine. The grape does not require a great deal of manure — not twenty-five cords per acre, like the market gardens of Arlington — but, like all flowers and fruits, it needs a soil so prepared as to be adapted to its

wants. Stable manure, if used, should be rotted down. Mr. Hunt had used bone and ashes as the cheapest manure; he would have used stable manure if cheaper. The rose-bug is an enemy that every grower has to contend with. The speaker had not tried covering the bunches with bags, but would have done so if he had had only a few vines. Small growers have as many rose-bugs as large ones, but there are not so many near forests as in the open country.

Hon. Marshall P. Wilder agreed with the practical statements made by Mr. Hunt, especially in regard to the value of the Concord grape, the capacity of our country for producing grapes, and the excellence and necessity of the fruit. No other fruit, except perhaps the strawberry, is now attracting so much interest as the grape, and none, if we except the apple, is of more importance as an article of luxury for our tables. No other country possesses such a vast extent of territory, or such possibilities and probabilities for its successful culture, as our own, embracing as it does twenty-five degrees of latitude, and a breadth of longitude from the Atlantic to the Pacific shores. Wherever our wild species will grow in any part of our immense territory, there other improved varieties will succeed. The field for progress is absolutely without limit. Mr. Wilder said that when, in his address before the American Pomological Society, in 1860, he predicted that the grape would be successfully grown in every State and Territory of our Union, and that the fox, or native flavor, then so much objected to, would, by the art of hybridization, become so modified and changed as to constitute one of the most excellent characteristics of our grapes, and give them a superiority over such varieties as the Black Hamburg and Sweetwater, and other foreign kinds, which are destitute of any special aroma, the prophecy was considered not only improbable, but the aspiration of a young and ardent disposition. The time has, however, now come, and he has lived to see it, and now confidently believes that this flavor thus modified will give us seedlings which will rival the Muscats and Frontignans of the old world.

Few are aware of the great extent of vine planting in our country. No sooner does a new variety of excellence appear than it is seized on and planted extensively. Such is the case with the Niagara grape, of which there are vineyards of from ten to fifty acres each, and so the cultivation of the grape will continue to in-

crease, until every section of our vast territory shall have varieties adapted to their several localities. Great progress has been made in grape culture since the establishment of this Society, when the only varieties of American grapes in our gardens were the Isabella and Catawba. Now we have numerous varieties of established excellence, but these are only the harbingers of the host of improved kinds which are to succeed them in coming time.

Mr. Wilder closed by naming the following varieties of grapes as possessing valuable characteristics:

Early: Moore's Early, Worden, Early Victor, Niagara.

Well established: Concord, Delaware, Brighton, Eumelan, Barry, Martha, Lindley, Wilder.

White: Martha, Lady, Prentiss, Pocklington, Niagara, Francis B. Hayes.

Of refined and superior flavor: Brighton, Lindley, Iona, and others.

Josiah W. Talbot had long felt that grapes are not only important but essential in every family. They can be grown by every one who has a rod of land. We need a certain amount of growth, and if we manure to exceed that, we lose by it. On rich land the vines are stimulated to make too much wood, instead of fruit. He recommended turf mould with a little ashes and bone as a fertilizer.

J. W. Manning said that in 1849 he was foreman in Samuel W. Cole's nursery, in Chelsea. In 1847, Mr. Cole got cuttings from the original vine of the Diana grape, and offered plants for sale in 1849. In that year, Mr. Bull came to the office of the Boston Cultivator, which Mr. Cole then edited, and told him he had a new and promising seedling black grape, and exchanged a plant of it for one of Diana. This plant was set out by the speaker, and soon fruited, but little account was made of it. It was not to be propagated for sale, and in the spring of 1853, Mr. Bull took the limited stock that had been propagated, and it was sent out under the name of Concord, in the spring of 1854.

C. M. Hovey said that the Diana was first exhibited before this Society in 1843. It was late in the season, and it was seen only by him and a few other persons. Samuel Downer, Senior, went to Milton to see the vine, and thought it the Catawba. Mrs. Crehore, in whose garden it originated, sent cuttings to Mr. Hovey, who cultivated it and sent it to A. J. Downing, by whom it was noticed

in the Horticulturist. Mr. Hovey found that it differed from the Catawba. The Concord was exhibited before this Society in 1853, and introduced for Mr. Bull by Hovey & Co., who sent out the first plants in 1854, when it attracted much attention, and still more in 1855. The Pocklington and Martha are descended from it. In 1854, the Isabella, Catawba, Diana, Hartford Prolific, and Delaware were the only good grapes known.

Mr. Hovey said that there is a difference between the cultivation of the grape for wine and for the table. For the latter we want large grapes, and more manure may be used; but for wine we want to get rid of the water. In France, vines are planted three feet apart each way, and this method was attempted in Cincinnati, but though they were not planted so closely, it was found that our native grapes would not submit to the severe pruning necessary. William J. Flagg speaks of twenty-two thousand vines being set on an acre in France. In that country, very little manure is given when the grapes are wanted for wine, but for fruit a greater quantity is applied, in proportion to the condition of the land. Mr. Hovey agreed with what Mr. Wilder had said of the importance of working out the fox flavor in our native grapes, and leaving the aroma which makes the Brighton and others so delicious, though he did not think we should produce anything to equal the Muscat of Alexandria.

William C. Strong said that though fully aware of the value of the Concord grape, he thought Mr. Hunt had stated it too strongly. It is far inferior in quality to either the Isabella or Catawba, which were cultivated here with success before our climate was unfavorably modified, as was also the foreign grape out of doors. Among the difficulties in growing grapes here, one is the competition of more favored climates. Varieties ripening before the Catawba are produced here at a loss. The Concord was an advance on the Isabella in earliness, and the Worden and Moore's Early have made still greater progress in the same direction. The Early Victor promises to be a great gain, and the Lady looks like a valuable acquisition for New England. The last is an iron-clad, and that is what we want. The speaker doubted the value for market of many of the new comers. The Lady Washington and Duchess may succeed in gardens. He thinks more and more of the Delaware; when it attains age it resists mildew. It is exceedingly productive, but cannot be produced as cheaply as the Con-

cord. It had been a question with him whether he could meet the rose-bug. If it continues to increase as in the last two or three years, it will become an evil of serious proportions, but he believed we can meet it. He had tried bagging; it is effectual, though involving much labor; but any care that will produce superior fruit will pay. The *Spiræa sorbifolia* attracts the rose-bug, and it is easy to shake them from it, but difficult to shake them from the bunches of grapes.

John B. Moore said that the grape crop is more certain than any other of the large fruits, even the apple. In a good location, we can be sure of a crop four years out of five, even with the rose-bug. He understood by a hardy grape, one that would stand twenty degrees below zero without laying down, and though he did not object to others, he thought they should be described as half-hardy. He did not advocate any particular plan of pruning, but any one that would fill the trellis with medium sized, mature young wood, is a good one. If the Concord is cut back to a single bud, besides the small one at the base of the shoot, half the time the bud left will be only a leaf bud, and varieties of this character should therefore be pruned longer. Mr. Moore thought that in some varieties he could distinguish the fruit buds from the leaf buds. If too many shoots are produced from leaf buds, they may be rubbed off when six inches long. He trains both on trellises and stakes. For trellises he uses posts eight feet long, set three feet in the ground, and the end posts braced. Three hundred feet will require twenty-two posts besides two for braces, costing seven cents each, delivered. They are of chestnut, not less than four and a half inches in diameter at the smaller end. The setting will cost $1.32; sixteen pounds of No. 14 galvanized wire, eighty feet to the pound, $1.44; and stretching the wire fifty cents, making a total of $4.94. This is the cheapest method of training. If the lines were only a hundred feet long they would cost $1.65, besides the two extra posts for bracing. If stakes were used, eighty-four would be required, costing six cents each, and $1.50 for setting, making $6.54. The trellis would not only be cheaper, but would last longer. The arms do not get loose on a trellis. He had trained somewhat on Dr. Fisher's plan, one arm being left long to bear this year and be cut away and replaced by another next year. Every other vine occupies the two upper and two lower wires. He had found difficulty in fruiting an arm left too long, and thought

Dr. Fisher might have over fertilized. The crop depends not so much on the amount of wood, as on good, well ripened wood. If properly pruned, it will mature a better bud. For market, he wants large bunches, for they sell better, and if the berries are large there is less exhaustion to the vine from maturing seeds, for there are not so many in a pound of grapes. If vines are trained on stakes it is necessary to coil them, to check their growth, and even then the flow of sap is not so uniform. He places his trellises nine feet apart, so that he can go between them with a cart, and the vines six feet apart on the trellis. If stakes are used, you can go between them either way with the cultivator. We want as much sun on the ground as possible, and we get more with stakes than with trellises. On trellises, the fruiting shoots must be tied up, but on stakes, this is not necessary. On stakes the fruit chafes in the wind and rubs off the bloom.

In regard to insects, the rose-bug (*Macrodactylus subspinosus*), which is one of the most troublesome, comes out of the ground the second week in June, and lasts thirty or forty days. The male then dies, and the female deposits about thirty eggs in the ground, from which the larvæ are hatched in about twenty days. They grow to about three-quarters of an inch in length, and the last of October go below the reach of frost and there winter. As soon as it thaws, they come up near the surface, and work round in the earth so as to form a cell in which the larva changes to a chrysalis. It will be seen that they cannot be reached in the egg, larva, or pupa state, and that there is no way to destroy them except by picking. As long ago as he could remember, he saw them as thick as they are now. In 1823, John Lowell described an apple tree as covered with them so thickly that destruction by hand was out of the question, and he spread sheets under the tree and shook them down and burned them. Dr. Green, of Mansfield, found eighty-six on a single rose-bud, which were crushed with one grasp of the hand. A steel-colored bug (*Haltica chalybea*), eats the germ of the bud, and seems to know when any one is coming after him.

Mr. Moore thought it is not desirable to use animal manure for grapes, and he has to be careful even with bone and ashes. They do best on poor land. He has several acres of grapes which have had no manure.

Mr. Talbot said that he picked the rose-bugs as long as one remained.

It was announced that on the next Saturday the subject would be "Strawberries and their Culture," by Hon. Marshall P. Wilder.

BUSINESS MEETING.

SATURDAY, March 3, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President BENJAMIN G. SMITH, in the chair.

N. B. White moved the following Vote: That all specimens of fruits exhibited for the Prospective Prizes, be weighed and measured; pears, apples, etc., single specimens; currants, grapes, etc., the cluster and individual berries to be measured to ascertain the diameter of the same.

The vote was referred to the Fruit Committee.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

SEWALL FISHER, of Framingham,
WILLIAM B. DINSMORE, of New York,
ALFRED W. SPENCER, of Dorchester.

Adjourned to Saturday, March 10.

MEETING FOR DISCUSSION.

STRAWBERRIES AND THEIR CULTURE.

By Hon. MARSHALL P. WILDER, Dorchester.

The strawberry is one of the most capricious plants with which I am acquainted. A variety may do well in a certain locality, and in another not far distant, may be an entire failure. There are some varieties, as of other fruits, such as the Baldwin apple, the Bartlett pear and the Concord grape, that are adapted to a wide extent of territory. Such is the fact with the Wilson strawberry, which is starred on the Catalogue of the American Pomological

Society for thirty-five States and Territories, while no other has more than twenty-eight stars. We must, therefore, study the characteristics of our soils, locations, and climates, and select such varieties as are best adapted to them. The acclimation of tender, or half-hardy plants, is a fallacy, and we shall at last be forced to rely on the fitness of things to the conditions in which we live.

Strawberry culture has assumed a rank of great importance in our fruit gardens. Great progress has been made in the introduction of new and fine kinds, but there is still room for improvement. Improvement is the destiny of our race. The instincts of nature, whether we believe in "evolution" or not, are all in the line of improvement. So it is with the fruits of the earth, and I know of no reason why we may not produce strawberries of the finest quality, and such as are adapted to every section of our vast territory.

To produce improved varieties, we should select as breeders, those that possess the characteristics we wish to obtain. To make sure of a perfect cross, I have chosen pistillate or female kinds, and impregnated them with those of the greatest excellence. As an illustration, I have taken the Crescent, although of second quality, as a female parent, on account of its extraordinary hardiness, productiveness, good form and color, and have crossed it with the President Wilder, Hervey Davis, Duncan, Triple Crown, and other high flavored, well formed, and good colored varieties. From these, and other crosses, I have obtained some very promising kinds, which I hope to present for your examination the coming season.

The time is fast approaching when the public will not be satisfied with so poor a strawberry as the Wilson, and if we can produce a better one, it will disappear from our markets. If we can produce another here of the quality and productiveness of the Hovey, in former years, and better suited to general cultivation, —and we can,—should we not do it? What we want are varieties of excellence that everybody can grow.

In regard to culture, I have to say, that the strawberry plant is a gross feeder, and without a well prepared soil, an abundant supply of proper food, and at the proper time, no great success can or ought to be anticipated. We should not plant on land which has for some years been occupied with the strawberry, and should manure and prepare most thoroughly before planting; give a good

top dressing immediately after the fruiting season, and repeat this in the spring, being very careful not to disturb the roots. Well rotted stable manure is good; ground bone and wood ashes, or, as a substitute, muriate of potash, are excellent fertilizers, and these are all the better if composted with soil or manure, and allowed to heat before using. In this climate, the spring is the best time for general planting. But when all the prerequisites are secured, we have often to contend with the heat and drought of summer, which are the most formidable of all difficulties. No plant in its fruiting season is more benefited by a constant supply of water than the strawberry, and I repeat my former advice, "Give the strawberry water! water! water! and still a little more water." We cannot control the clouds. If I were to grow the strawberry on a large scale, for market, I would certainly provide the means of irrigation, so that water might be given when it is needed.

Some varieties require to be grown in hills, and to have the runners cut off as soon as they appear; such are the Sharpless, Bidwell, and Triomphe de Gand. Some are pistillate varieties, and require to have the bisexual kinds planted near by, and be in bloom at the same time. Such are the Hovey, Crescent, Jersey Queen, and Manchester. For the want of proper impregnation, these kinds often fail of a good crop, but with a suitable companion, the pistillate varieties produce very large crops, as did the Hovey forty years ago, and as, if I mistake not, Mr. Hovey will show us that it can do now.

Some varieties produce a large number of trusses, and give promise, when in bloom, of extraordinary crops, but do not yield so much as those of less pretentious appearance. The truth is, there is a limit to the power of production, and where there is a superabundance of trusses and flowers, only a portion will set their fruit and carry it out to perfection, without excessive stimulation. Another cause of failure may be traced to a deficiency of pollen on some of the bisexual varieties, and it is well to plant near them also, such as are furnished with an abundance of it.

Among the varieties which are taking the place of the Wilson, and other inferior kinds, is the Charles Downing. Although not quite firm enough for long transportation it is, for home and near markets, assuming a prominent place for general cultivation. While the Wilson, which has been known for twenty-five years, or more, has added on the Catalogue of the American Pomological

Society only three stars in the last eight years, the Charles Downing, a more recent variety, has added four times as many in the same period, and stands to-day second for cultivation on the list of forty-one varieties. This variety blights in some seasons, but it has never done so with me for fifteen years, and there is no variety with which I am acquainted, of equally good quality, which is now so generally cultivated.

As to the system of planting, I need say but little before so many skilful cultivators. For garden culture, I like the method of planting in rows three feet apart, with plants one foot in the row, allowing each to make from two to four shoulder runners, and no more, for the first season. These, by autumn, will constitute a thrifty row of strong bearing plants, and will produce more than the common matted beds. For field culture, I would plant in rows four feet apart, and a foot apart in the row, and where wide beds are allowed, it will be found of great benefit to pinch off all superfluous runners, so as to have none but strong plants. The degeneracy, or wearing out of varieties, as it is called, I think may often be traced to the exhaustion of proper elements in the soil, and to bad manipulation of the plants. The strawberry should not be grown on the same soil for more than two or three years without an intervening crop. Give it fresh, rich soil, and use strong uniform plants, and we shall hear but little of the running out of varieties. In our rage for novelties, such as are described as "the best in the world," we meet with many disappointments, and sometimes become disgusted with their failure, and cast them out as worthless kinds, without a fair trial. So with some of our old kinds which have not been so much cultivated lately as in former years, such as the Hovey, Jucunda, Triomphe de Gand, and others which were once popular. It would be, I think, a wise measure for this Society to offer a special premium for the restoration of those old valuable varieties of fruits and flowers which have gone out from general cultivation.

Among the new varieties of the strawberry now being promulgated as possessing extraordinarily good characteristics, are the Manchester, Jersey Queen, Iron Clad, James Vick, and Big Bob (pardon me for uttering that vulgar name), and should any one of these varities come up to the merits claimed for them, we should need no other kinds. But, my friends, we have not yet arrived at the summit of perfection with the strawberry or any other fruit. Let

not what I have said prevent you from testing these new varieties. Plant! plant! plant! prove all things and hold fast to those which are good. We are still in progress. The field for improvement is immense, and with the appliances of cross-fertilization by human skill, its limits are almost without bounds.

Discussion.

Charles M. Hovey was called on by the Chairman, and said that the remarks of the essayist on the necessity of sustaining the reputation of the old varieties, were well put. Many are passed over by the majority of cultivators, and afterwards some cultivators will discover their merits. An old variety may in this way be supposed to be new, and may receive a new name, and hence the immense number of synonymes, not only of strawberries but of pears, grapes, and other fruits. Some strawberries have as many as fifteen synonymes in Europe, and we have had a few here. The Champion and Black Defiance are said to be identical. A variety found in Connecticut and sent out as new, proved to be Rivers's Eliza. Varieties picked up in old gardens are apt to prove synonymous with others.

As to culture, water and manure are the most important items. When La Constante was introduced the speaker planted a bed on hard clayey ground on the slope of a hill, and laid a hose at the top so that they could have all the water they needed, and he never saw such a crop. The fruit was exceedingly large and fine; he picked from two or three rows one hundred baskets, which he sold for one hundred dollars. He approved the suggestions of the essayist in regard to manure. Guano is not safe for strawberries; fifteen or sixteen years ago he had berries of the Admiral Dundas eight or nine inches in circumference, and he ordered a man to give the plants a little guano. The following year he applied so much that the leaves grew so high that the fruit could not be seen, and he got no fruit for three years. Wild strawberries are always found to thrive where the wood has been burnt off, showing the benefit of ashes. We should fertilize to make fruit rather than leaves.

Varieties all seem to do best on the soil where they originated. The originators prepare the beds carefully, and get enormous crops; but when the plants are sent out they do not come up to the expectations formed from the extraordinary statements put forth by the

originators, that they have borne such crops as never were seen before. The Manchester, we are told, will bear double the crop of the Hovey, and the James Vick double that of the Manchester. Something must, however, be allowed to the introducers of new kinds, for they would not undertake the work without some enthusiasm to sustain them. If one out of fifty of the new kinds proves valuable, we shall be well paid for testing them. The James Vick is no doubt a very good kind. The Manchester, as shown here, was an entire disappointment. It is, however, not so sour as the Wilson, and is of better color and form, and may become popular. The Shaker Seedling originated near Albany, and a member of the Shaker Society called on the speaker and wished him to introduce it, describing it as of fine color, size, etc., but when a quart of the berries was received, not one was an inch in diameter, and they were pale and soft. It soon passed out of cultivation. The Great American and Jersey Queen have not been shown here to any extent.

Mr. Hovey agreed with the advice given by the essayist to continue to plant seed, in the hope of gaining something superior. When a break once occurs there is no knowing what may be produced. A new variety, to be worthy of introduction, should be hardy, vigorous, and productive, with fruit of good color and fine quality, and it is difficult to get all these points in one variety. A strawberry may be of fair size, but the leaves may burn, or the hulls may be very large, or may turn over so as to be difficult to take hold of. The late J. O. Wellington, of Belmont, said that a woman would pick a hundred quarts of Hovey's Seedlings a day. All points must be looked at. Well selected seed, from the best varieties, especially from pistillate kinds, will produce seedlings as good as the average of the new kinds introduced as remarkable strawberries. Actual impregnation by hand is, however, the only sure way to obtain the best results.

E. W. Wood said that the opening paragraph of Mr. Wilder's essay gave the cause of the difference of opinion which exists in regard to the varieties of strawberries. If we look at the names of the kinds for which this Society offers prizes, and then at those cultivated in the West, we shall find in the latter hardly a name that we recognize, but coming farther east we begin to find a few of those cultivated here. The Wilson, however, adapts itself to all soils, and succeeds on dry land, but has failed for the last few

years. Mr. Wilder does not believe in the degeneracy of varieties, but the speaker had found the Cutter's Seedling for the last four or five years very different from what it was twenty years ago. Then it was one of the best for table use; he never saw a variety which excelled it in flavor. Mr. Wilder and Mr. Hovey had spoken of the Charles Downing as the successor of the Wilson, and it may do for a near market. Last year it was exempt from blight, but it blighted the year before.

Mr. Wilder said that it had never blighted with him.

Mr. Wood said that it had blighted so much as to deter growers from planting it for market. Last year he grew three varieties, the Charles Downing, Sharpless, and Seth Boyden, under the same conditions, and the Sharpless, marketed on the same day with the Charles Downing, averaged almost twice as much in price. The market does not encourage growers to select varieties of the best quality; buyers do not discriminate as to quality. In point of quality the Hervey Davis is worth twice as much as the Sharpless, but the latter will outsell the former in the market every time. Buyers in the market select from appearance only. The strong points of the Wilson are that it is bright colored when other kinds are green, and its good looks and long keeping.

A universal rule in selecting ground for strawberries is to choose ground that will produce a good crop of grass. On his own ground, which is a strong, heavy clay loam, the speaker would like a shower every day. For exhibition fruit, he would set strong runners in August, and keep them as single plants, so that the vigor should be all centred in one plant. For market, he would set them in spring, and let them cover the ground. The Sharpless should be set in rows not less than four feet apart, and eighteen inches in the rows, and will then cover the ground. Strength is gained by taking off the runners, especially the late ones, which exhaust the plant to no profit. This will make strong fruiting plants.

George Hill spoke of the importance of wintering strawberry plants well. They are not generally covered early enough, and are frequently injured by the first cold weather, when the ground freezes two or three inches deep, which does more harm than severer cold later in the season. Mr. Hill exhibited a quantity of plants, most of which were in excellent condition, but some had been injured by the cold, and could not produce the fruit that others would. Strawberries do not often fail for want of manure,

but are more often injured by the winter. The place to look for signs of injury is in the crown. If they have wintered well, he thins out every other one. He covers some as early as the first of November, and those covered at that time have gone through safely, when those covered later failed. He uses old meadow hay, covering thinly; he wants to see the plants through the covering. He agreed with what had been said about irrigating, but there is such a thing as watering too much, which injures the roots. They must have air, which they cannot have if the ground is filled with water. It is death to celery to stand under water twenty-four hours in hot weather; the best way is to saturate the ground, and then let it go for several days or weeks. Mr. Hill agreed with Mr. Wilder that it is important not to disturb the roots of strawberry plants.

William H. Hills, of Plaistow, N. H., said that he had been to the expense of getting the new kinds, and with the Manchester came a chromolith of a plant, showing a most extraordinary crop; but he thought he could beat it with a section of a row of his Miner's Great Prolific, which, on the sunny side, looked almost like a winrow of fruit. The berries ripened on one side before the other, and he found it difficult to get pickers who would pick only ripe fruit. He had found very little difference in the season of ripening of strawberries; the early, middle, and late all come together, and he wants a late variety. The Crescent opens the season, and is the last after the market is over. This variety has been underrated. It is not soft, and remains hard a good while on the vines, and the quality is fair when perfectly ripe. The Cumberland Triumph failed entirely with the speaker last year, giving only a crop of buttons; the circumference was large, but the end was not developed; he did not know whether it was a peculiarity of the variety, or whether the pollen had been washed away. The Glendale was recommended as one of the latest, but he was not pleased with it; it is of a dingy color — light scarlet, — has a very large hull, and is no later than others. The Crystal City has been recommended as the earliest, but a hundred plants did not give him a handful of berries. If this is the rule, it should be stricken from the list. The Windsor Chief was very fine with him last year. He plants in field culture, three feet by one, which is too near for matted rows. It is difficult to keep matted rows down to one foot. In regard to the age of beds, he did not advise replant-

ing as often as is generally done; he has beds where there was a good crop last year, and he expects to get two or three times as much this year.

Mr. Wilder thought the Crystal City valuable only as being very early. The Cumberland Triumph is magnificent in form and color. Mr. Hills's is the first unfavorable experience that he had heard of. The speaker has thrown aside the Glendale.

Mr. Hovey thought the Cumberland Triumph is pistillate, and that Mr. Hills did not have anything to fertilize it.

Mr. Hills said that it is not pistillate; and that there were perfect flowering varieties on each side of it. He thought the imperfection caused more by the weather when the plant was in flower.

Mr. Hovey said that the strawberry season with him lasts from the 7th of June to the 15th of July. He had shown Hovey's Seedling five successive weeks. The Jenny Lind is at least ten days earlier than any other.

Samuel H. Pierce thought the selection of ground for strawberries very important. Every one can pick out a place where they will do better than anywhere else on his farm. He has an acre and a half, from which he got a crop of eleven thousand baskets. The next year he planted it with cauliflowers, and the next with Sharpless strawberries, and got another good crop. He did not think that the Sharpless, or any other variety, will bring enough more in the market to pay for extra cultivation. His Sharpless brought but little more than the Charles Downing. The Wilson is gone by; he procured extra fine plants from New Jersey, and they did well one year, but the next year they did not do well.

Mr. Wilder said that he had never recommended the Wilson. He spoke of degeneracy generally, and not with reference to any particular variety.

John B. Moore spoke of the manurial question, and said that he was glad to see that persons did not assent to the idea that the crop is in proportion to the quantity of manure used. If a plant has food enough, it is a question whether more is not hurtful. He knew of crops in Dighton that have been injured by too much manure. He does not approve the exclusive use of highly nitrogenous manure, such as guano or stable manure. A large portion of the Dighton growers use guano as a top-dressing in spring for such varieties as the Wilson, which do not make foliage enough to cover the fruit. Guano produces abundant foliage, and for that

reason it will not do to apply it to the Sharpless. There is no better fertilizer for strawberries than bone and ashes, but he likes to put ten cords of stable manure to the acre along with it.

The first improvement in the strawberry was at Montreuil, in France, where remarkably fine wild strawberries were produced in a charcoal burners' village. No further improvement came for many years, when the Chili strawberry was introduced, and formed natural crosses, improving the size. In England they were improved by artificial crossing.

The seedlings which the speaker raised from the Early Virginia all came the same as the parent, and seedlings from Rivers's Eliza, with many other kinds growing around it, were the same, both in foliage and fruit, as the parent. After finding these results, it came into his mind to plant a pistillate variety where it could be fertilized by only one kind, and then he got as many varieties as seedlings. He did not agree with Mr. Hovey that this method is not as good as hand fertilization.

The length of time that a bed should be kept must be judged of by the owner. If it is vigorous in the fall, why not keep it? It cannot be replaced by any crop that will pay as much. The Wilson is one of the quickest to fail, but no rule can be laid down. A few years ago he had some strawberries in hills in bearing for five years. He agreed with Mr. Hill that plants are often injured in the fall by a sudden freeze before they are covered. The same variety will not succeed everywhere, and therefore it is impossible to name any one as the best for all cultivators. The Charles Downing is soft, and has behaved so badly for the last three or four years that the Concord and Dighton growers have thrown it aside. At Concord, the Sharpless and Miner's Prolific are the favorites; the latter is very much like the Charles Downing, but larger. The Cumberland Triumph is one of the best market berries, but is a little soft and light colored. He grows the Hervey Davis. He undertook to grow for quality, but the market does not appreciate it; all that buyers care for is a big, firm fruit; those who look for fine quality are so few in number, that it is hardly worth while to cater for them. When the Wilson was introduced he would not plant it at first, but he had to come to it. Though the fruit is so poor, there is a new crop of fools every year to buy them.

C. M. Atkinson said that ninety-nine out of a hundred cultiva-

tors of strawberries think it is impossible to give them too much manure, but he agreed with Mr. Moore that it is not. In England he had a position in a garden seventy years old, where there was an unlimited supply of manure, but the strawberries utterly failed, though the cauliflowers, lettuce, and cabbages were admirable. The strawberry beds were restored by dressing with stiff clay thrown out in laying a pipe, after it had laid all winter, and produced a crop of fruit so fine that he took specimens to the exhibition of the London Horticultural Society. All strawberries will run out unless bearing plants are selected, and the "blind" ones rejected. The uniform crops of English growers are made from forced plants. Hovey's Seedling is particularly liable to come "blind," and when you see a plant with a good crop of fruit, you should put a stick down by it and propagate from it.

O. B. Hadwen was called on, and said that when people enter into the cultivation of fruit in early life, the taste seems to continue, and they grow in enthusiam. He had cultivated strawberries for nearly fifty years, including the old Alpine, the Early Virginia, and the Jenny Lind. He cultivated the Hovey's Seedling in 1840 and 1882.

The subject for the next Saturday was announced as "Hybrid Perpetual Roses," to be opened by John B. Moore.

BUSINESS MEETING.

SATURDAY, March 10, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President stated that he had received a cable message from the Imperial Russian Horticultural Society, announcing that the International Exposition of Horticulture and Congress of Botanists and Horticulturists, fixed for May next, in celebration of the twenty-fifth anniversary of that society, had been postponed until next year.

Hon. Marshall P. Wilder, Chairman of the Committee appointed at the meeting on the 24th of February, to prepare resolutions in

memory of Hon. Paul A. Chadbourne, D.D., L.L.D., reported the following:—

Resolved, That the Massachusetts Horticultural Society sympathizes most deeply with the Massachusetts Agricultural College, our Commonwealth, and our country, in the loss sustained by the death of the Hon. Paul A. Chadbourne, D.D., L.L.D., the President of said college; that we sincerely mourn the sudden removal of one so highly distinguished for his learning, scientific attainments, and incessant labors to promote the intellectual and moral improvement of his fellow men, and especially to advance those great rural interests on which, more than on any others, the prosperity and happiness of the world depend.

Resolved, That we gratefully recognize in Dr. Chadbourne a man of the highest moral principles and noblest aspirations,—who always stood forth manfully for the right, whose soul was ever alive to the best interests of mankind, and whose name will be remembered in the annals of our country, as a benefactor to the human race.

Resolved, That these proceedings be entered upon the records of this Society, and that a copy of the same be transmitted to the family of the deceased, with the assurance of the sympathy of the Society with them in their bereavement.

MARSHALL P. WILDER,
JOHN B. MOORE,
WILLIAM C. STRONG,
} *Committee.*

Mr. Wilder said that the death of President Chadbourne, at a time when he had raised the college to an elevation which it had never attained before,—when he had laid his plans for still further improvement in the future, and when the trustees were confiding in his energy and ability, was a most mysterious dispensation of Providence. At the last meeting of the trustees there was a foreshadowing in the mind of the speaker of what has taken place. President Chadbourne stated that he had been doing the work of two professors, each more than that of any one in Williams College, and that he could not do it any longer. Mr. Wilder then moved that the thanks of the Board be tendered to President Chadbourne, for his zeal and energy, which was accordingly done, and he now regarded it as providential that he made this motion.

John B. Moore desired to say that he agreed fully with the

resolutions; President Chadbourne was an able educator, and took great interest in horticulture and agriculture, though engaged in other branches of education. His friends hoped and trusted that he would elevate the college to the highest possible usefulness.

Benjamin P. Ware had had the honor of being associated with President Chadbourne, and wished to say a few words in regard to the great work already accomplished by him. The whole system of instruction at the college had been reorganized, and all the improvements suggested by thirty years' experience in education had been substantially adopted. Though when elected, he was much occupied with other pursuits, he promised to see that the interests of the college should not suffer. He found it not fully provided with professors, and had been doing the work of two, besides preaching on Sundays. The college had been brought by him into a complete and harmonious working condition. It seemed in conversation with him that he had premonitions of his departure, for he had asked, "What will become of that college in case I am taken sick?" Though it now seemed impossible to fill his place, yet the speaker believed that inasmuch as the Great Ruler of the world had seen fit to take him away, He would provide a man to succeed him.

President Hayes said that President Chadbourne was born in the little town of Berwick, Maine, which was also his own native place. The Chadbourne estate was deeded to his ancestors by the Indians, and most of it remained in the family until the middle of the present century. The birthplace of the speaker was on what was formerly the Chadbourne estate. The Chadbourne family came over as the representatives of the Lords Proprietors of the colony, and it is an interesting fact that they caused a vineyard to be planted there two hundred years ago, and made frequent inquiries how it flourished. The locality is still known as "The Vineyard." President Chadbourne's father was in moderate circumstances, and not able to give his son an education, but, through his own energy, he went to Exeter Academy, and afterwards to college. He made himself what he was, and graduated at the head of his class, a grand exemplification of what can be done by poor boys; and he has left the memory of his work at Amherst as a monument of what one of them has done.

The resolutions were unanimously adopted by a rising vote.

Benjamin G. Smith announced the decease of Arthur Bryant, Senior, of Princeton, Illinois, a Corresponding Member of the Society, and moved the appointment of a committee to prepare memorial resolutions. The motion was carried, and the Chair appointed as that committee, Hon. Marshall P. Wilder, Benjamin G. Smith, and Charles M. Hovey.

Adjourned to Saturday, March 17.

MEETING FOR DISCUSSION.

Hybrid Perpetual Roses.

By John B. Moore, Concord.

Mr. President, Ladies and Gentlemen:

In discussing the subject of Hybrid Perpetual Roses, I may say that they are one of the classes of flowers that I have cultivated with a great deal of interest, and from their beauty and fragrance I have received more real pleasure and enjoyment than from any other flowers that I have grown. I feel my want of power to describe the wonderful beauty of form and color combined in the perfect rose, which with its delightful fragrance renders it the acknowledged Queen of Flowers.

If I had the powers of description of some of our Ex-Presidents, I might in my love for this flower soar almost into the ethereal regions, but for want of this you will have to put up with plain matter of fact descriptions of varieties and methods of culture. And here let me say that the object of this discussion today is to communicate to each other our ideas of the value of the different varieties of Hybrid Perpetual Roses, and how to cultivate them in the best manner; to compare our own with other methods, and adopt the best. If any of us have made mistakes (and who has not), if they are described it will enable others to avoid doing the same thing. And if any person has a method considered superior to others we may give it a trial.

Impressed with these views, and with my duties to my fellow-members, from whom I have received so much instruction, I find that I still have some diffidence about submitting my methods and conclusions, well knowing that among our members will be found the most eminent horticultural talent in New England. And if

any of my views are incorrect it is a duty you owe to this Society, and I shall also consider it a favor to myself, that you should correct them.

The land upon which most of my roses have been planted has a slight inclination to the south; the soil is a sandy loam with a loose sandy subsoil, and most of it is quite dry. It is a soil that would be considered unsuitable for rose culture, but it was such a location and soil as I had near my house, and conveniently situated for the purpose intended, but not such a soil as I should have selected could I have done any better. The fault was largely in the texture of the soil, which was sandy and very loose, and therefore subject to drying up quickly. It had, however, one good point, and that was excellent natural drainage — only too good, for the water passed through soon after falling upon the soil. The remedy applied was a dressing of a material often found in sand-banks and improperly called marl, but really a dried or consolidated quicksand. It looks like and is as hard to excavate as clay, but, unlike clay, when dried it readily falls to pieces, and the particles are finer than common flour. About one inch in thickness was spread upon the rose border when dry, and, reduced to this impalpable powder, was worked into the soil with a harrow and cultivator, and every rain carried these minute particles into and intermixed them with the soil, which by this application was changed from a porous and leachy to a retentive soil, fairly suitable for the purpose intended, and the cost was only the carting and mixing with the soil. I have spoken more particularly of this method of correcting a sandy soil, as it may be useful to others whose situation is the same, not only for roses but also for the general improvement of the soil, for wherever there is a dry, loose, sandy soil, there is almost always this same material in the vicinity.

There was then applied a dressing of stable manure, which was intended to be at the rate of ten cords to the acre; this was ploughed in very deep and the land was afterwards levelled with a harrow, which completed the preparation of the land. It was then planted with rose plants in straight rows four feet apart, and the plants three feet apart in the rows. The plants were one year old, mostly worked on the Manetti and brier stocks. Part of the piece was planted in the autumn and the rest in the spring, and I could not perceive but that both succeeded equally well.

The after cultivation has been simply keeping the lot clean and free from weeds, and in the fall banking up the plants about one foot high with earth taken from spaces between the rows. When the earth is removed from around the plants in the spring, they are pruned; the weak, poor wood being cut out, and the slow growing varieties cut back to six or eight inches, while the stronger growers should be left ten or twelve inches in length. The roses that I have shown in these rooms have been grown in precisely the way I have described, and with the addition of water when needed. And in watering roses, strawberries, or in fact any crop, there does not appear to be any better way than to imitate nature — that is, to wet the land thoroughly, as it would be with a shower, and then stop until it is needed again.

Like other novices I planted a great many kinds. My information about varieties was what I had been able to obtain from the descriptions that I found in the nurserymen's catalogues, and from the few books on the rose. From this source I found out all about the good qualities of any particular rose, and none of its bad ones; the latter information I am constantly acquiring, and while it is annoying and costly, it may perhaps be useful to me in future plantings.

The insects preying upon the rose or its foliage must be *exterminated*. I am using the mildest term in this respect compatible with growing good roses. What are they? First, the rose-bug, whose habits I described two weeks ago. There does not appear to be any feasible way of getting rid of them except by hand picking.

I have received a postal card from C. B. Lovewell, of Wellesley, in regard to the rose-bug, in which he says, "I have destroyed them by the use of whale oil soap of the usual strength, two pounds to fifteen gallons of water. It was used by A. D. Webber as long ago as 1849 on peach trees, and three applications were sufficient to clear them all out. I have used it on grape vines with complete success for years." This, however, would spoil all the roses, even if it destroyed the rose-bugs, and I do not feel certain that it would do that.

The rose slug is another depredator which destroys the foliage and ruins everything when found in large numbers. They are easily kept under by dusting the plants with powdered hellebore in May and early June, two or three applications being sufficient.

There are also two or more varieties of beetles, about the size of a curculio, with long snouts, that eat into and ruin the buds, and a few green worms; these are always to be crushed when found. The rose hopper has not done any material injury to my roses.

It has occurred to me that the judging of roses for prizes by points would probably determine the fact as to which are the best roses for planting, all things considered. Now, so far as general cultivation is concerned, the thousands who are looking to this Society for information as to what varieties of roses they had better plant in their gardens, so that they and their families can enjoy the beauty and fragrance of this flower, and with a reasonable prospect of its production, I think that they as well as ourselves would arrive at correct conclusions, as to the value of the different varieties better, by having them judged by points, and those points entered on the prize card, so that all who read may learn.

The list of varieties of the rose submitted to this Society two years ago by a committee appointed for that purpose, and of which I was a member, has, in my judgment, some great defects. It was necessarily a compromise list. This committee being composed of gentlemen living in different localities, and growing roses on very dissimilar soils, and some of them not very familiar with the more recent varieties, there should be no wonder at their arriving at somewhat different conclusions. Further causes of imperfection were that some varieties succeed only on particular soils and locations, while others grow well almost anywhere, and still others had not been well tested.

Now there are certain indispensable requisites to make a good Hybrid Perpetual Rose for ordinary or general cultivation in the garden, viz., hardiness, vigor of growth, beauty, both in form and color, fragrance, and constancy of bloom. It is hard to find all these good qualities in any one variety of the rose, but the nearer any variety comes to possessing these requirements, the better the general cultivator will be satisfied with the results from growing it, and if we can designate such varieties, the better we shall have done our duty to the public.

Let us all remember, Mr. President, that this Society is leading the public taste in regard to flowers, as well as to fruits and vegetables, and that it is an educational institution in all matters pertaining to horticulture. Let us remember that we are here today for the purpose of acquiring knowledge not only for our own

practice, but also that we may be able, as we are willing, to impart that knowledge so useful to us, to others by our published Transactions.

Discussion.

Mr. Moore added that, while he had described his own method of culture, he did not claim any superior merit for it, for he had found that a flower can be well grown in two ways. It is absolutely necessary not to prune strong growing kinds too short. What are called Hybrid Perpetual Roses are made up in various ways; some of them are crosses of the China with the Damask rose, and might more properly be called Hybrid Chinese. Such are the greater part of the so-called Hybrid Perpetuals. They bloom but once in the season. Some Hybrid Perpetual roses are beautiful, but wanting in fragrance; others lose color in a shower or turn purple, while others look bright. The very full double kinds do not open well; the long, pointed buds with large petals open best. Some have weak stems; others are weak growers. Louis Van Houtte is, perhaps, the most perfect dark rose, but it is a poor grower, and has a tendency to bloom itself to death; but this latter defect is within the control of the grower. Marie Baumann and Alfred Colomb are two of the best roses; the former is best early in the season, and with care can be grown satisfactorily. Both are fragrant and, in good cultivation, bloom more than once in the season, and the blooms are always good. Some varieties are troubled by mildew, which spreads and affects others.

Mr. Moore next went over and criticised the list of forty-eight Hybrid Perpetual roses, recommended by a Committee of the Society two years ago. The classification by colors is often wrong; pink and rose are often confounded. Baroness Rothschild is of fine color, though pink rather than blush, and beautiful to look at, both in flower and foliage, but it has no fragrance, and is not particularly satisfactory out-doors. La France is a Hybrid Tea, a poor grower, and does not open well. It is about as tender as a Tea rose, and is not valuable for forcing to sell. John Hopper is classed as pink, but is more exactly rose and carmine. It seldom blooms more than once, and has little or no odor. François Michelon is not pink, but rose; it has thin petals and a poor stem. Marguerite de St. Amand is bright rose; it does not open very well. Marquise de Castellane is rose color; it blooms more

than once, but is somewhat tender and has no fragrance. The next two, Mme. Georges Schwartz and Mme. Nachury, Mr. Moore said he would not plant. The Comtesse Chabrillant is of good form and size, but not particularly desirable. The next two, Marie Finger and Mlle. Eugénie Verdier, classed as rose-salmon, are tender and poor growers out-doors, though the color is very pretty. Victor Verdier is not very hardy, and has no fragrance; there are others that are superior. Mme. G. Luizet is not rose color but light pink, and the best of the color. A specimen was shown by the speaker, from a graft inserted since the first of December. The color is solid and clear. Magna Charta is fragrant, but blooms only once.

Hon. Marshall P. Wilder said that Magna Charta blooms in the fall with him.

Mr. Moore said that the Marchioness of Exeter is fragrant, but hardly as good as Magna Charta. Édouard Morren is not worth growing out-doors. Dupuy Jamain is not rose color, but cherry red; it is a fine grower, but the flowers are only semi-double, and fade. Mme. Thérèse Levet is a free blooming kind. Étienne Levet is a fine rose, of beautiful form, but not fragrant. Alfred Colomb is carmine crimson, fragrant, and one of the very best red roses. It would probably score more points than any other except Mme. G. Luizet. Charles Lefebvre has no fragrance, and is ruined by rain and warm sun. Marie Baumann is crimson vermilion; fragrant, and early in the season better than Alfred Colomb, but later not so good. If the speaker were to select half a dozen roses, this would be one of them. Mme. Victor Verdier is darker — carmine crimson, — fragrant, a good grower, and a very fine rose. Horace Vernet is crimson and scarlet, of fine form, but a little weak in growth. Dr. Andry is of no account. Exposition de Brie is identical with Maurice Bernardin and Ferdinand de Lesseps. It cannot be spared even from a small collection. Mons. E. Y. Teas is carmine crimson, fragrant, rather dwarf, but very fine. Countess of Oxford fades quickly, and mildews extremely easily. Mrs. Laxton is of fine form and color, and fragrant, but a poor grower. Duchesse de Caylus is large and double, but no better than some others. Sir Garnet Wolseley is fragrant and sometimes fine, but mildews. Sénateur Vaïsse can hardly be distinguished from Mons. E. Y. Teas, but the latter is better. The Duke of Edinburgh has no fragrance, and blooms but once.

President Thiers is of a peculiar color; a little wet turns it purple. It blooms pretty constantly. Richard Wallace is not wanted in twenty-five varieties. Thomas Mills is rosy crimson, a strong grower, blooms two or three times a year, and is a fine garden rose. Louis Van Houtte is fine in form and color, and fragrant, but a poor grower; it wants a warm location. Mons. Boncenne is of maroon color, hardy and good, but blooms only once. Abel Carrière is velvety crimson and very fine, but blooms only once. Xavier Olibo is deep crimson and a fine rose, but a poor grower. La Rosière is deep velvety crimson, like Prince Camille de Rohan, but better; it is fragrant. Pierre Notting is deep crimson and violet, fragrant, and one of the grandest roses, but does not open freely. Fisher Holmes is an improved Gen. Jacqueminot, for outdoor culture; it is of the same color, and a free bloomer and fragrant.

Mr. Moore presented the following list as his choice for twenty-four kinds:

Mabel Morrison,	Étiènne Levet,
Julius Finger (Hybrid Tea),	Alfred Colomb,
Baroness Rothschild,	Charles Lefebvre,
John Hopper,	Marie Baumann,
François Michelon,	Mme. Victor Verdier,
Marquise de Castellane,	Maurice Bernardin,
Mme. Gabriel Luizet,	Mons. E. Y. Teas,
Magna Charta,	Thomas Mills,
Louis Van Houtte,	Pierre Notting,
Abel Carrière,	Fisher Holmes,
Xavier Olibo,	Baron de Bonstettin,
La Rosière,	Rev. J. B. M. Camm.

Baron de Bonstettin resembles Mons. Boncenne, but is better. Rev. J. B. M. Camm is one of the finest; the color stands well. Jules Margottin has many good points; it is a constant bloomer, and good to have in the garden. Duke of Teck is bright crimson, a good grower, and far superior to most of the new varieties; among the many new ones which Mr. Moore has imported, not one out of ten would be equal to it. Mrs. Harry Turner is claimed in England to be the best rose; it is a good grower, with handsome scarlet crimson flowers. Good roses cannot be had for nothing; every one who wants them must pay for them, and the price is

eternal vigilance. A man who does not love roses will not grow them well, and had better not undertake it.

Mr. Moore said that, although his list was carefully selected, he might want to change it in two years. It is very likely that some of those on it will not grow as well as some of those which he has rejected. In selecting roses, permanency of color is a most important point.

William C. Strong, was called on by the President, and spoke of the importance of fertilization. The essayist had said nothing of continuous fertilization. We all know that feeding is the first step to success, and the process is almost limitless. He had made a bed for roses in the house, of one-third stable manure, and two-thirds loam. Although the impression of many growers would be that such a bed would be unsatisfactory, the manure warmed up the soil, and the growth of the plants was prodigious and uniformly good, and is so to this day, and there is now a very heavy crop of roses on the bed. With that experience, he dressed a bed in autumn with stable manure, and almost ruined it, and a year ago, he watered a bed with a solution of horse manure before it had started, and greatly injured it. The time when roses are fed is very important. Liquid manure may be applied somewhat freely while they are in growth, — not very strong, but constantly, — and produce wonderful results. Roses want daily food; cow manure may be applied more freely than horse manure. Roses are enormous feeders; he had seen the roots run into green cow manure without injury. It is more difficult to apply cow manure in a liquid form than horse manure; it is thick and cannot be drawn through pipes and hose. He had tried artificial manures, but was afraid to use them freely. He had found the thrips, fretter, or hopper, a more serious trouble than Mr. Moore thought it. He doubted the efficacy of hellebore, but had not tried it fully. There is no objection to the employment of whale oil soap before the roses bloom. He wished to emphasize the effects of green horse manure; it will injure roses if it leaches on to their roots to any extent while they are in a dormant state.

Mr. Moore said it is true that you must constantly furnish roses with food to make new wood. After heaping up the earth around his rose bushes in autumn, he gives a dressing of stable manure, but not until the ground is frozen, and it keeps the ground from thawing and freezing. When the earth is removed from the bushes

in the spring, he gives potash and bone, and if liquid manure is needed, he gives it weak, but early and often.

Mr. Wilder felt obliged to Mr. Moore for his careful examination of the lists of roses. It is an established principle that plants should not be fed while in a dormant state, and especially that liquid manure should not be applied. Liquid manure should be very weak; Mr. Mechi's rule was that it should only color the water. Mr. Wilder uses cow manure because it is so mild; he puts it into a gunny-bag, and this into a great cistern, and never gives it without dilution. It has a most sensible effect on all his plants, but he never gives it to them until they are ready to take up food.

Mr. Moore said that his method of making liquid manure is to get a large tub and place two strips of board across it, and on these to put a flour barrel filled with manure, and having holes bored in it. Water is then poured into the barrel and leaches into the tub; when the strength of the manure is exhausted, the barrel is emptied and filled with fresh. The liquid manure must be diluted for use.

Col. Henry W. Wilson thought that some method of sub-irrigation would be devised for applying liquid manure. The principle has been practically wrought out in California already.

E. W. Wood said that Mr. Moore had made roses a special study, and his directions for their culture were given fairly, plainly, and honestly. The speaker had most of the kinds on the list recommended, but had never seen any really good white roses. He thought that if five out of a hundred rose bushes were white, nine-tenths of all the rose-bugs would be found on the five white ones. La France, which is so tender here, in France is marked highest, showing that we must make great allowances in reading European books on the rose. He would grow Baroness Rothschild for the sake of a single flower, and the foliage is very beautiful. He plants his roses in rows three feet apart, and two feet apart in the rows, and banks up high in autumn.

Mr. Moore said that he put his rows four feet apart in order to work between them with a horse.

Mr. Wood said that he had found no difficulty in the less space. After banking up he fills in between with manure, and when he hauls away the earth in the spring, he mixes the manure with it. Louis Van Houtte, when in perfection, is the best rose grown;

Mr. Ellwanger scales it at eighty points in all respects but vigor, which he rates at zero. The speaker has a plant which has bloomed well for six years with no extra care. He would place Alfred Colomb at the head of the list. The greatest improvement of the rose is in endowing it with continuous bloom. Many persons object to planting roses, that they bloom only two or three weeks, but with proper selection of varieties they may be an ornament every day. Mme. Alfred Rougemont blooms all the time, and for bouquets and vases is one of the best. Mr. Hovey thinks it is a little tender, but the speaker had not found it so.

Joseph Clark recommended the Baroness Prevost as being, though an old rose, a very fine bloomer through the summer.

Mr. Strong asked whether any one had had any experience with the Triomphe d'Angers. It is not an exhibition rose, and changes color, which makes it objectionable to florists; but there is no rose that he had found so free flowering, and he thought it would be satisfactory to the public. He intended to cultivate it so as to bring it in as a substitute for the Gen. Jacqueminot at Christmas.

C. M. Atkinson thought that giving too much prominence to fragrance in judging roses by points, would have a tendency to throw out really good roses. He would instruct judges not to be too particular in regard to fragrance. The more double a rose is—that is, the more the stamens are turned into petals—the less chance there is that it will be fragrant. He enjoys Tea roses most in their last stages, because they are then most fragrant.

Mr. Moore said there are many roses which have no fragrance, that he would not discard, but he should consider them more valuable if they were fragrant. A rose destitute of fragrance may yet take a prize. The Cornelia Cook is a Tea rose without fragrance. He questioned Mr. Atkinson's view that very double roses are not so fragrant as less double varieties. The Alfred Colomb, E. Y. Teas, Marie Baumann, and Rev. J. B. M. Camm are all extra double and very fragrant.

Mr. Strong remarked that some Tea roses have a positively disagreeable odor, and that every one might not agree with the judgment of an awarding committee in regard to the fragrance of roses.

Mr. Moore thought that if a rose possessed a disagreeable odor —like that of the skunk cabbage for instance — there would be no difference in regard to condemning it. Every one knows and loves the peculiar odor which we call the fragrance of the rose.

Mr. Wilder exhibited two seedling Chinese Azaleas in flower at two years from seed. Last year he exhibited plants which showed remarkable vigor at a year from seed, and expressed the belief that he should have them in bloom at two years. He was himself astonished at such early flowering, as were M. Van Houtte and other cultivators whom he informed of his success, for it was never supposed to be possible. He has quite a number of these seedlings coming on.

Notice was given that the subject for the next Saturday would be the "Culture of Currants, Raspberries, Gooseberries and Blackberries," to be opened by James Comley.

BUSINESS MEETING.

SATURDAY, March 17, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair. No business being brought before the meeting, it

Adjourned to Saturday, March 24.

MEETING FOR DISCUSSION.

CULTURE OF CURRANTS, GOOSEBERRIES, BLACKBERRIES, AND RASPBERRIES.

It was expected that the discussion would be opened by James Comley, but as he was prevented by illness from attending, the President called on Benjamin G. Smith, who said that he had to contend with a stiff clay soil in his garden, but in one corner he found a deposit of reddish sandy loam, of which he had two hundred cartloads spread on the garden, and the whole underdrained, subsoiled, and enriched with barnyard manure, and he had been fairly successful in cultivating gooseberries and currants. He had cultivated English gooseberries for eight years without mildew. He manures them freely and prunes severely. It is impossible to get good fruit from them without strong, healthy

foliage. The currant worm is the greatest obstacle to success, but he dusts with hellebore two or three times in a season, which keeps them from doing much injury. He prunes the bushes as carefully as he does his grape vines—some on the spur system and some with long shoots, and finds both equally successful. He used to mulch them but lately has not, and they have done equally well. English gooseberries must be shaded from the hot noon suns; his are planted on the north side of a high fence, twelve or fifteen feet. from it. Currants also do well in the shade. Though it has been said that they should be renewed every five or six years, he cultivates the same bushes that he did fifteen years ago. With these, and also with his raspberries, he aims to produce the best fruit without regard to quantity.

John B. Moore was next called on, and said that the blackberry is one of the best fruits when well grown and ripened. The great difficulty with it is the winter-killing of the canes. The Dorchester, Lawton, and Wilson are tender, and the Snyder, Kittatinny, and Wachusett are hardier, but the fruit of the last named is small and of inferior quality. In field culture blackberries must be grown on high land, without manure, otherwise the canes will be tender. They are all hardy in the roots. The speaker knows persons in Weston who cultivate the blackberry largely, and lay down the canes and cover them. If they grow too rank in summer the canes must be shortened. He has thrown aside the Wachusett and others, and last year planted the Snyder, and is testing others in regard to profit as well as quality.

He has grown raspberries to a considerable extent; there are some that are called hardy, but he knows none that will not be injured by the winter. There is some question in regard to the best varieties. He has grown the Herstine and it is of good quality, and good for field culture, but he wants something better. The Saunders is a little better for field culture. In a rich soil where they will grow well, raspberries should be planted in rows six feet apart, and from two and a half to three feet apart in the rows. It is a mistake to plant in hills as is commonly done. He sets a braced post two and a half or three feet high at each end of the row, and stretches a galvanized wire, with a stake every thirty or forty feet to support it. The canes are tied to this wire, reasonably tight, with cotton twine. They are spread about six inches apart, and do not smother each other. This method of support-

ing them is cheaper than stakes, and it permits of cultivation by horse power, which should be used as far as possible. Most kinds throw up suckers, which should be chopped off, or there will be too many weak shoots. In the fall the canes should be laid down, which is not so much work as would be supposed. It takes two men to do the work to advantage; one to hold the tops down and the other to throw on the earth until they are fastened down. Begin at one end and throw a shovelful of earth against the first canes, so that they shall not be bent too short; then bend them down and throw a shovelful on the tops, so as to keep them down, and so on; and when all are thus fastened go over and finish covering. The soil should first be stirred with a cultivator. They should be uncovered and lifted up as soon as the ground is thawed, or they will start too soon. Mr. Moore cuts out the old canes as soon as they have fruited, though he could not say that it is any better than leaving them until they are laid down. Currants do better on a stiff than on a sandy soil, and will grow in the shade.

Mr. Smith said it is true that the soil should not be stirred in the spring around gooseberries, unless it is done very early. It may be done in August, but manure should not be applied late in the season. The growth is made early in the season, and it is unwise to start them into late growth, He uses coal ashes on his plums and small fruits, and finds they are more vigorous where it is applied. The best English gooseberries are Woodward's Whitesmith, Wellington's Glory, Glenton Green, and Yellow Amber; and of native varieties, the Downing and Smith's Seedling.

E. W. Wood said that currants are easily grown, and are reliable, and might be more generally grown with profit than they are. Many of those sold in Boston come from Connecticut. Mr. Smith's views in regard to their cultivation are correct, as is shown by the many prizes which he takes. The main variety for profit or for the table is the Versaillaise, which invariably takes all the Society's prizes for red currants. It has been complained of as not prolific, and it is true that it will not give good crops year after year, neglected under a stone wall as farmers used to grow currants. Currants will not stand neglect, but Mr. Smith's experience of fifteen or twenty years shows that, with care, they will endure for a long time. He cuts out all the old wood and gets new, and feeds them well. The currant will flourish in partial shade, and is, therefore, well adapted for small gardens. Mr. Smith's success with gooseberries has been remarkable.

Raspberries and blackberries will produce good crops with less manure than currants require. The quantity of raspberries shown at the exhibitions of the Society has lately been curtailed by the loss of plants during winter, but the speaker had heard reports of more profit from their culture than from that of any other small fruit. No variety is perfectly hardy; he cultivated the Clarke for seven or eight years, and lost none except one year. More Franconias are shown at our exhibitions than any other variety, and none is more reliable. For the last three years the Saunders has taken the first prize; it is of better quality than the Herstine, though less attractive. The Saunders is soft, but good for home use. The speaker saw a most beautiful show of Dorchester blackberries on the grounds of J. B. Case, in Weston. They were set in rows eight feet apart, and the plants four feet apart in the row, and tied to wires stretched four or five feet from the ground. A row of posts was set on each side of the row of blackberries and three feet from it, and on these the wires were stretched. They were topped at six feet in height. The soil was strong, and the ground was covered with meadow hay, which was allowed to remain. After the canes had ripened they were bent down and covered with earth and hay. A fair top-dressing was given in the fall, and they had been thus cultivated with uniform success for a series of years. The speaker had never seen such an immense crop. He has a row of the Kittatinny from which he never lost a crop. The quality is very good, and the fruit brings a good price. It is more hardy than the Dorchester, the early canes not being winter-killed. We want something more reliable in blackberries than the Dorchester, and which shall not be too much expense to protect, such as might be produced from a cross of the Dorchester with the Snyder, or something more hardy.

George F. Wheeler said that the Snyder and Wachusett are grown at Concord more largely than other blackberries. We have not yet got a variety that will endure the winter without laying down. It is not of much use to cultivate them if you have not the right soil; a light soil is not good; they want something stronger, either rocky or clayey. Mr. Case's soil is better than a lighter one. Last year there were few blackberries, owing to the winter-killing of the canes, but last summer was dry and the wood ripened, and has probably come through the winter better. He had been most successful with the Clarke raspberry; the Franconia wants a rocky or

clayey soil; on his ground it was feeble, and he discarded it. The Philadelphia is a great bearer, but the color is poor for market. The Brandywine is of feeble growth, but hardy and bright looking, and though the quality is not approved in exhibitions, it is fine for shipping, and brings good prices. The Cuthbert is a strong grower, but winter-killed last year.

Col. Henry W. Wilson said that we had heard how to make small fruits profitable, and he would say something for those who want fine fruit for their own tables. He trains the Lawton blackberry on a slat fence, preferring the north side, and pinches the shoots so as to cause them to make laterals, and gets a profusion of fruit which is perfectly bewildering. The bunches of ten or twelve berries each were all ripe at once. The blackberry is not a gross feeder, but will grow in any good garden soil. All small fruits want mineral salts—phosphoric acid, potash, and lime—and they must be grown in proper soil, or you will get no satisfactory results. The soil should be trenched, which is not expensive. The thorough preparation of the soil is as profitable on a large as on a small scale. However fine the fruit which we see in woodland clearings, we can produce finer in the garden. Mr. Smith's clay ground is probably the wash of diluvial moraines, and the coal ashes penetrates and lightens the soil. The blackberry wants water when swelling off, and hence the benefit of mulching or turning on a stream of water. Col. Wilson's raspberries are planted on a northern slope — a clayey soil with a sandy subsoil,— and trained up through barrel hoops, and supply two families. The currant will thrive in absolute shade, where no sunlight reaches the soil, but he has given up its cultivation on account of the currant worm. Potash is one of the constituent elements of granite, and having occasion to quarry thirty or forty thousand tons of stone he noticed that the quarrymen carefully saved all the fine dust for use in their gardens. It can be composted with lime, and will furnish potash in just the right quantity for the soil. Feldspar gives twenty-five per cent of caustic potash, and the speaker hoped we should be able to develop several such deposits. All salts for fertilizers should be neutral.

William H. Hills, of Plaistow, N. H., said that he cultivated the fruits under discussion in a small way, growing them for his table and selling the surplus. He examines all the new things he can, and was surprised that the new varieties of these fruits had

not been spoken of. If the stories told in the catalogues are true, they will give us all we want, without the need of either cultivation or manure. He does not tie up his raspberries, except when the snow has broken them down. He clips them with hedge shears when they are about three feet high, and the blackberries when they are a little higher; but this must not be done when you want to multiply tip-rooting raspberries. He goes over the plants at two or three different times, and clips the tender ends as they reach the desired height. If neglected till the more advanced canes become hard, they will not branch and form a bushy top. He cuts back the branches when a foot and a half long. He thought he could not afford stakes. He had found the Turner raspberry entirely hardy, never having a tip injured, and the same is true of the Snyder blackberry, which sets fruit very bountifully, but he feared that it would prove too small. In New Hampshire there are blackberries and raspberries growing wild, and people ridicule the idea of cultivating them, when they can, as some claim, pick fifty bushels of wild ones at their doors; but the cultivated ones are superior, if they are allowed to ripen. The speaker recommended to young men to examine wild varieties and select the finest, and they would often find one of superior quality, which they should transplant and cultivate, or save the seed of. Most of the superior varieties have been produced in this way. The men who recommend the Souhegan (Black Cap) raspberry, are those who have large quantities of plants, bought of the originator. The currant worm strips the bushes of their leaves so suddenly that it must be very carefully watched.

Mr. Hills has a cold grapery containing twenty varieties, where he has no trouble with mildew, sulphur being sure death to it. He had a Hartford Prolific grape vine trained on his house, the fruit of which mildewed, and he heated bricks and placed under the vine and sprinkled with sulphur, and could smell the fumes of sulphur every time he passed by for a week. With sulphur sprinkled on the ground, he got as good results from the heat of the sun. The mildew made no progress after the application. He thought sulphur might be applied to gooseberries to prevent mildew.

Hon. Marshall P. Wilder said that in Mr. Hill's location, the raspberry is covered with snow. By clipping and causing the growth of laterals, he causes the wood to ripen, and makes a com-

paratively hardy plant of a tender one. The speaker had found no raspberry perfectly hardy except the Turner, and here the others must be laid down, as directed by Mr. Moore, which is easily done even when acres are cultivated. He thought Mr. Moore's system of training a good one. The Franconia raspberry is about as good as anything we have ever had. Knevett's Giant is of the finest quality, but more tender and more difficult to grow. Good as the Cuthbert may seem, Brinckle's Orange is more delicious for amateurs, but it is a little tender. If he could have but one raspberry he would have the Souchetti Blanc, which has become a standard variety, on account of its long and abundant bearing. He has the Versaillaise currant planted in the lines of his pear trees, and sells from one hundred to one hundred and fifty dollars' worth every year. It is the most profitable variety, and was introduced by him from Europe, as were also the Hornet, Knevett's, and Souchetti raspberries. Dana's Transparent is the finest white currant, and is worth cultivating for ornament. The Dorchester blackberry was introduced by Eliphalet Thayer, of Dorchester, who first exhibited it before this Society on the 7th of August, 1841, and that afternoon the speaker went with the late Cheever Newhall to see it growing. He has never found it tender, and has never failed of a crop. In his location he has the influence of the sea air, which prevents injury from frost.

The impositions by outrageously exaggerated descriptions of new fruits are a national and a moral evil. If any one of them comes anywhere near the recommendations given, we shall never need anything more. It will not do to encourage them. He is not satisfied without trying all the new things under his own eye, and had just received, in his old age, a case of plants from Belgium. If we get one fruit out of fifty as good as the Franconia raspberry or Versaillaise currant, it will be worth all we have spent.

Dr. H. Holmes said that he had grown the Red Dutch currant and a white variety as old, and also the Belgian or Grand Imperial, the Versaillaise, and the Cherry, and the last is ahead in size, and consequently most acceptable in the family. The Versaillaise is next in size and more prolific, but none excel the Red Dutch in quality. The Belgian is a little later than the others; he has it until the middle of September, and has an ample supply for the robins. It grows up in tree form, and makes the strongest wood of any. He got the plants from Capt. Davis, of Arlington. He

finds three broods of currant worms; the first from the 12th to the 16th of May; the second about the 25th of May, and the last from the 15th to the 20th of June. The eggs are laid on the under side of the leaves, and the insects at first are almost microscopic in size. He applies a strong infusion of hellebore with a syringe, instead of dusting with the powder, and in this way reaches the young worms on the under side of the leaves, and has succeeded in getting good crops. The worms must be carefully watched, as they will sometimes spoil the bushes in forty-eight hours. He cultivates gooseberries, and gets all the fruit he wants, without any trouble from mildew; he has an old English variety which is a prolific bearer, and has given satisfaction. He agreed with all that had been said to the credit of the Franconia raspberry; it has stood the winters with him, while the Clarke stood two winters, and the third nearly every cane was killed. He cultivates the Lawton blackberry, but the canes are too stiff to lay down, and are largely winter-killed.

William C. Strong said that he belonged to the class which publishes catalogues, and in his cultivation of small fruits, he wished to produce plants rather than fruit, and therefore, allowed the suckers of his raspberries and blackberries to grow. The Taylor's Prolific blackberry had proved as hardy as the Snyder, and perhaps larger, and it gave such a profusion of fruit as he had never witnessed. In regard to mildew, prevention is better than cure. The exemption of Mr. Smith's English gooseberries, is largely owing to the position of his plants, where they are partially sheltered from the sun and have the advantage of humidity. For clipping raspberries and blackberries an old scythe blade fastened to a handle is more effectual than shears.

Robert Manning said that he had found the Dorchester blackberry so tender that he always covered it. He had bent down and covered a cane measuring over thirteen feet in length, besides laterals. Knevett's Giant raspberry is one of the finest varieties, and will sometimes stand the winter, but to be sure of a crop they must be covered.

Mr. Moore said that the Franconia raspberry wants high, rocky soils, and that there are better and more productive kinds. It does not stand as well as it did ten years ago, and does not succeed with him. He prefers the Saunders, Herstine, or Northumberland Fillbasket.

Mr. Wilder said that his soil, where the Franconia flourishes, is deep clay.

Mr. Smith said that his soil is clayey like Mr. Wilder's, and he has grown the Franconia there from the same stools for twenty-two years, and it is as good now as ever. It does not make as many suckers as other kinds.

Aaron D. Capen endorsed everything that Mr. Smith had said in favor of the Franconia. He has stools that have stood for twenty years in the same place, and he did not recollect manuring them above three times. Two years ago he had canes ten feet high, and he did not trim them until he laid them down.

Mr. Moore said that he did not object to the Franconia except in certain locations. It will not succeed with half the cultivators. It is troubled with leaf blight.

Mr. Hills asked whether the Taylor blackberry is distinct from the Snyder.

Mr. Strong did not know that he could state the difference in the characteristics of the two varieties, and his Taylors are in an entirely different soil from his Snyders; but the Taylor is amazingly prolific.

Mr. Wilder said that the Taylor is a freer grower than the Snyder, and the fruit is larger.

Mr. Capen recommended the cultivation of the Low Blackberry, or Dewberry; he had seen it very fine in Connecticut.

Mr. Moore said that raspberry or blackberry canes, not topped, throw stronger shoots and give larger fruit.

It was announced that on the next Saturday Edmund Hersey would read a paper on "Preparing and Fertilizing the soil for the Growth of Plants."

BUSINESS MEETING.

SATURDAY, March 24, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee appointed two weeks previously to prepare a memorial of Arthur Bryant, reported as follows:

He had been long acquainted with Mr. Bryant, and felt it a duty to do what he could to perpetuate his memory. Mr. Bryant was an educated man, under the tutorship of his brother, William Cullen Bryant, the poet, with whom for a time he was associated on the New York Evening Post. He was a thorough scholar, eminent for his knowledge of Greek and Botany, and for his love of the beautiful in nature. He was especially interested in the conservation of our forests and in the planting of new ones. He was the author of a book on "Forest Trees for Shelter, Ornament, and Profit;" was a pioneer nurseryman in the west, President of the Illinois State Horticultural Society, and Vice-President of the American Pomological Society for that State. His decease has been widely noticed by the press, and as a son of Massachusetts, and a Corresponding Member of this Society, it is fitting that we, too, should preserve in our records a remembrance of his services and worth. Therefore be it

Resolved, That in the death of Arthur Bryant, Senior, a Corresponding Member of this Society, we have, in common with the whole country, to deplore the loss of one of our most distinguished pioneers of horticultural science, rural adornment, and the preservation of our forests.

Resolved, That in the character of Mr. Bryant we recognize an instinctive love of home, country, and the progress of rural adornment, and the virtues of an enterprising, upright, and Christian gentleman.

Resolved, That a copy of these resolutions be forwarded to the family of the deceased.

MARSHALL P. WILDER,
BENJAMIN G. SMITH, } *Committee.*

Benjamin G. Smith seconded the resolutions, remarking that he had much pleasure in the acquaintance of Mr. Bryant, who bore a strong resemblance to his brother, the poet. Mr. Smith added that Mr. Bryant was a student at the United States Military Academy at West Point.

Leander Wetherell said that when at an academy at Cummington, Mr. Bryant's native place, he visited his home and had the pleasure of meeting him. He was much impressed with the beauful scenery of the town, amidst which Mr. Bryant grew up.

The resolutions were unanimously adopted.

Adjourned to Saturday, March 31.

MEETING FOR DISCUSSION.

Fertilizing and Preparing the Soil for the Growth of Plants.

By Edmund Hersey, Hingham.

The subject assigned to me covers so wide a field for thought, that the time allowed for the opening essay is not sufficient to give even an outline of the principal points. I have therefore confined myself to two points: — First, the power of plants to gather up their special food; and, Second, the condition of soil to grow crops to the best advantage.

Nature, when left to herself, has ways of her own for fertilizing and preparing the soil for the moderate growth of native plants, but when man demands of her an excessive growth of either native or foreign plants, and removes from the soil both the stalk and the seed, she refuses to comply with his demands unless he makes especial efforts to assist her, by the application of fertilizers and the pulverizing of the soil, to supply the increased demand thus made upon her.

Whenever we make an attempt to produce more than a natural growth of vegetation on any soil, if we would work to the best advantage, we need to know something of plant growth—a subject which we scarcely enter upon before we find ourselves surrounded by the most minute complications, shrouded in mystery, yet always working out the same results.

The rose, the pink, and the strawberry will grow side by side, the roots mingling together in the same soil, and the branches and leaves intertwining in, and surrounded by the same air; yet the rose bush gathers up and manufactures the particular substance necessary to produce the wood, the leaf and the flower of the rose, while the pink, from the same sources, gathers up materials necessary to produce the stalk, the leaf, and the flower of the pink; and the strawberry gathers from the same soil and air the material that forms, not only the stalk, the leaf, and the flower, but also the luscious fruit of the strawberry, and each from the same sources gathers up the delightful odors, so peculiar to the flower of each plant. Compare the fruit of the strawberry, with that of the rose, or with the seed of the pink, and how unlike they are, yet the roots and leaves feed upon the same materials.

The question arises, "Do the leaves and roots of plants have the power of selection, and of taking in precisely what is required to produce all of the peculiarities of each plant? Evidently, they do not, except to a limited degree. If they did, would they not refuse to take up poisonous substances, which they sometimes do in such quantities as to destroy the life of the plant? Must we not come to the conclusion that each plant is provided with a laboratory wherein is manufactured the particular substance required to produce all of the peculiarities of the plant and the fruit; in fact, is there not much evidence to prove that each minute cell, of which plants are composed, is complete in itself, and capable of manufacturing out of the substances drawn up through the roots and absorbed by the leaves, a material which will produce another cell precisely like it, and also a material possessing all the peculiarities of the fruit of the plant, which the stalk and leaf represent? We get some evidence of this if we take a seedling apple tree, with two branches, grafting one with a scion of the Sweet Bough, and the other with a scion of the Baldwin apple. As the material for each branch of the tree is drawn up by the same roots, there can be no doubt that the material which enters the wood of the scion of the sweet apple, is precisely the same as that which enters the wood of the scion of the sour apple. Yet, when this is acted upon by the air drawn in by the leaves, in the cells of the wood of the sweet apple, the result is the formation of the material necessary to produce the form, color, and flavor, as well as the keeping qualities of the Sweet Bough; while that which enters the cells of the wood of the sour apple, produces that substance necessary to produce the form, color, flavor, and keeping qualities of the Baldwin apple. To discover the difference in the structure of the cells of these two varieties of apples, requires higher perceptive powers than have as yet been given to man. We only know the results; in contemplating them we are lost in wonder, and filled with admiration at the perfectness of structure and the positiveness of action of these minute germs of vegetable life.

The more closely we examine the vegetable world the more perfect we find it, and the higher is our admiration and the stronger our love for that Supreme Intelligence which governs the universe, even to the smallest germs of animal and vegetable life.

I have thus apparently diverged somewhat from my subject, but it has been done to call your attention to the power of plants to

gather up the fertilizers applied to the soil and convert them into substances that represent the peculiarities of each plant. The chemist tells us that the three principal substances which we need to apply to the soil to assist the growth of plants, are Phosphate, Potash, and Nitrogen. Chemistry also teaches us that plants contain large quantities of carbon; but we are taught that carbon in the form of carbonic acid is floating in the air in sufficient quantities to supply the wants of growing plants. This may be true, and probably is where only a natural growth is required, but where an excessive growth is required there appears to be good evidence to prove that a larger quantity is beneficial. The atmosphere contains only about six parts of carbonic acid to each ten thousand parts, while the air in good garden soil contains more than four hundred parts, and a newly manured field during wet weather more than one thousand parts to each ten thousand. As vegetation on well manured land grows very rapidly after a shower, it is evident that the large quantity of carbonic acid which must necessarily be in the soil does no serious injury, but some good. There may be, and probably is, a point beyond which it is not safe to furnish carbonic acid for plant growth, but it evidently is not often reached in the cultivation of plants in the open air. The presence of large quantities of carbonic acid in the soil is believed to be beneficial, not so much by direct action on the growing plants as by its action on the soil, dissolving valuable mineral elements, and rendering them available for plant food.

In fertilizing the soil we should ever keep in view the fact that everything which enters into plants must first be reduced to atoms; and it is also well to keep in mind the fact that nature has wonderful power to assist man in this reduction. If we apply coarse materials to the soil, the heat, the air, and the moisture commence at once the work of decomposition, the rapidity of which depends on the character of the materials applied, and the manner of its application.

As our principal object in the preparation of the soil is to encourage rapid plant growth, we should endeavor to make ourselves familiar with those conditions necessary to accomplish this purpose. It being already understood that all fertilizing materials before becoming plant food must be first reduced to atoms, and be of a character to mingle with both water and air, it is evident that in the application of fertilizers we should make an effort to place

them where they will change into atoms fast enough to supply the wants of the growing plants, and it is also evident that the soil should be changed into that condition best adapted for the rapid decomposition of coarse materials applied. If we apply stable manure it should be placed where it will receive the heat of the sun, the oxygen of the air, and the moisture of the earth; all of which act on the materials of which the manure is composed, separating the mineral from the gaseous portions, and reducing them to minute particles. Good cultivators have learned that rapid growth is best secured by thoroughly mixing the manure with well pulverized soil, keeping it within a few inches of the surface; this is because the light, pulverized soil readily admits the heat, air, and water.

The fact should not be overlooked that for rapid plant growth, the soil should be made light by considerable quantities of partially decayed vegetation. A soil with all of the coarse particles removed, by sifting through a fine sieve, would not be as well adapted to the rapid growth of plants, as a soil lightened up with partially decayed vegetation, for several reasons. First, because, being more compact, the air is in a great measure shut out. Second, the particles of earth being so fine, there is nothing to keep it from becoming soggy with the first rain, and becoming firm and hard as soon as it dries. Third, there being no vegetation to decompose, there can be no rapid manufacture of nitric acid, or nitrous acid and ammonia, and in fact no carbonic acid, all of which are necessary for plant growth, and also necessary to produce a chemical action on the soil. Whenever we apply highly concentrated fertilizers to the soil, we should always do it in connection with coarse manures, or apply it to soils already rich in partially decayed vegetation.

It should always be our aim to keep the soil so light and loose near the surface, that the air and moisture will have a free circulation through several inches in depth, for these are the true elements which join hands as messengers, and unite with the atoms of phosphate, potash, lime, silica, nitrogenous compounds, and other materials, and when united carry them to the roots of the growing plants.

In preparing the soil for growing plants, there is still another point that should not be lost sight of, which is, that if we would secure the most rapid growth, we must not only have the soil so

prepared that the air and moisture will readily circulate through all portions of it to the depth of several inches, but we must also have the soil filled, during the period of plant growth, with all the elements of plant food in that particular form necessary to readily unite with both the air and water; yet if we would use economy in our operations, we must avoid applying more fertilizers in a soluble form than the plants can consume; especially is this true of nitrogenous compounds.

He who applies a hundred cords of manure to the acre, manufactures nitrogenous and carbonaceous substances more rapidly than the most vigorous growing crops can consume them. While possibly the crop might be larger than if only twenty cords had been applied, it would be grown at a much less profit, except under very extraordinary circumstances; for plants, like animals, can consume only a limited amount of food; and plants, like animals, to keep them healthy, must have food containing the different elements in the right proportions. For example, if we should apply large quantities of nitrates to the soil, with no phosphates or alkalies, our plants would refuse to grow with any vigor. So with any other single element.

To work judiciously, we must work intelligently, and apply to each crop the proper proportions of each element; this is a work not easily accomplished; for though the chemist can tell us what each plant is composed of, he cannot so readily tell us from what particular source each element is derived; and as few of the materials applied as fertilizers have passed into the form of available plant food, we are compelled to judge how rapidly they will change, or we cannot tell what quantities it is necessary to apply to furnish each particular element as fast as needed by the crop.

In no department of agriculture is light more needed than in that which relates to the application of manures. It is very easy to make an expensive mistake, by applying more manure than enough to supply all the wants of the growing crop, and by applying it in such condition, or in such manner, that it will not have become plant food until long after wanted by the growing crop. Thus the plants suffer for the want of food while surrounded with more than sufficient, but in a state that cannot be taken up. When coarse manure is covered up eight or ten inches in depth, and permitted to remain undisturbed, it must not be expected that it will be converted into plant food as quickly as if applied within a few inches

of the surface, where it will be disturbed every time the crop is cultivated. While it is important that a portion of the fertilizers should be applied in a condition and in a manner to furnish plenty of food to the young growing plant, it is also important that a considerable portion should be applied in a condition and in a manner to furnish food to the maturing plant and the ripening seed.

In high culture, care is taken to keep the land filled with fertilizers in different stages of decomposition, that the plants may, in all stages of growth, have plenty of food: but in ordinary field culture, we do not usually do this, therefore we often fail to get a good crop; not because manure enough has not been applied, but because it has not become plant food at just the time needed by the growing crop.

He who would be a successful cultivator should be a close observer of nature, and should strive to become as familiar with the wants of growing plants as he is with the wants of farm animals; for to tend and feed growing crops with the greatest economy, requires quite as much intelligence as to care for, and feed, cattle successfully.

The farmer who should gather up winter fodder for his cattle, and then leave it in the open air to waste its nutritive qualities, would be considered as adopting a very wasteful practice; but the same farmer might compost all of his manure in the open air, and leave it six months without exciting a single remark; yet the manure, in the process of decomposition, will lose a considerable portion of its plant food, and will also have its power to create important chemical changes in the soil greatly reduced. It is believed by some that, when vegetable substances are decomposed in the soil, nitrogen is manufactured, by a process not yet understood, in quantities so large that a portion of it must be drawn from the air.

It is becoming more and more evident that, in field culture, barn manure should be applied in a fresh state, and so mingled with the soil as to encourage rapid decomposition, and thus create a mechanical as well as chemical action on the soil, which is highly beneficial to the growing crop, and which would be lost if decomposition was permitted to take place in the compost heap.

In conclusion, I would call your attention to the fact that the over application and misapplication of phosphate and potash, does not result in that loss which is caused by the over application and

misapplication of materials containing nitrogen and carbon, because, though the soil is filled with molecules composed of mineral substances, water and air, to an extent far beyond the capacity of plants to absorb, when they reach the surface of the soil the water evaporates, and the air mingles with its native element, thus separating from, and leaving in the soil unconsumed, the mineral elements; but when the soil is overcharged with molecules made up of air, water, and nitrous acid in combination with ammonia, or carbonate of ammonia, the moment they come to the air they mingle with it, and are thus lost, so far as relates to any future advantage to the soil.

From this the natural conclusion is, that in fertilizing the soil for growing crops, we may apply with a liberal hand both phosphate and potash without fear of loss, except by leaching; but that when we apply those elements of fertility which change to a gaseous form, it is not, as a rule, economy to apply them in quantities much larger than the growing crops can consume.

Discussion.

John B. Moore said that away from cities it is becoming a serious question how we are to grow crops, and restore and keep up the fertility of soils which have been depleted by over production. The essayist is right in the belief that chemical fertilizers should be applied in connection with coarse manures. Market gardeners can see no benefit from chemical fertilizers; but how should they, when they apply along with them as much stable manure as the crop needs? The speaker had seen very large crops of corn grown year after year, with chemical fertilizers. But the question comes up, how are we to get them? For, at present, it is evident that they cost more than farmers can afford to pay for them, though they are better than formerly. The nitrogen which they contain is from various sources. They are all valuable, but it is useless to apply them to plants which are not in vigorous growth. He had seen a dressing of nitrate of soda applied to grass in autumn, when it was utterly useless. It disappeared either by leaching or evaporation; but, if applied in spring it would have caused a heavy growth. The lysimeter does not show any loss of potash and bone by leaching, but it does show a loss of nitric acid in the winter, but not in the growing season. He

had found by experience that it is unnecessary to pay any attention to providing a supply of nitrogen, but is of the opinion that, with the ordinary methods of manuring, Nature will provide a sufficient quantity. He believes that it is manufactured in the soil by the condensation of the nitrogen of the atmosphere, or enough is supplied by the decomposition of stable manure. Constant cultivation and stirring of the soil causes it to absorb nitrogen from the air. Of two pieces of corn or cabbages, one of which is frequently stirred, and the other is not, the former will be much better than the latter; and this superiority is not due to mechanical action alone. But it is necessary to provide potash and phosphoric acid. No chemist can tell in what form any substance will be fifteen minutes after it is put into the soil.

Col. Henry W. Wilson said that in preparing soil for the growth of plants it is not generally stirred more than from six to ten inches in depth, but he thought the deeper it is stirred, inside of four feet, the better. A box of earth four feet in depth, will hold all the moisture necessary to support vegetation. No plant can be induced to send its roots below the water table — that is, the level at which water stands in the soil. If this is too high, it must be lowered by draining. He could judge by the character of the grasses on a given soil whether it needed draining. Thorough pulverization in connection with perfect drainage, is the most important operation on the soil. Air is the great disintegrator, and oxygen is its great agent in that work. No form of nitrogen is plant food, but only a solvent. The atmosphere is the great source of nitrogen; all the upper parts are filled with nitrogen clouds, which are absorbed and brought down by the rain. Carbon in the soil is one of the constituents of butter and sugar, and by roasting the soil, the carbon is supplied in a form to be taken up. The essayist spoke of plants absorbing atoms; but no particle of undissolved matter can enter a plant; their capillary organs are so minute that food can enter only in solution. They cannot assimilate particles. Potash is not easily evaporated, and so its virtue remains in the soil for the ensuing year; but ammonia applied in the autumn is lost. All fertilizers should be applied in a neutral form; lime is harmful to land, and so is sulphuric acid, but when applied in combination, as sulphate of lime, the water and air decompose it just fast enough, and all fertilizers should be in such neutral form that the forces of nature will dissolve them.

If we attempt to make superphosphate of lime by adding sulphuric acid to bone, we shall fail, but if we put water first, and then add the sulphuric acid, we shall succeed.

Leander Wetherell thought that when soil, unless of extraordinary depth, was trenched four feet deep, the vegetable humus was covered up.

Col. Wilson said that whenever the soil had been prepared so deep for certain kinds of fruits, the result was beneficial. For the strawberry it would be an advantage, but not for the grape.

Mr. Wetherell said that he has a good farm, and where he ploughed bound out grass land six inches deep, and harrowed the same way, and then applied the Stockbridge formula for corn, and harrowed again crosswise, and planted corn, he got one of the best crops he had ever had. An Ohio farmer said that he had never seen a better crop. There were eighty bushels to the acre, and the crop was not so great in seed as in growth. The late Moses Stebbins, of South Deerfield bought an old, worn out farm, in the Connecticut valley, with alluvial, where the surface was exhausted, and ploughed deep and turned up fresh soil to the increase of his crops. Mr. Stebbins recommended John Green, at Hadley, to plough deep, because of his own success, but Mr. Green's soil was light, with a gravelly subsoil and little humus, and when the plough was put down deep in that soil, the difference could be seen in the following crop; the humus was all turned under the gravel. Ploughing must be adapted to the soil.

Nitrogen is commercially the most valuable fertilizer; some forms are highly active and others slow in their action. Ammonia and nitric acid are the most active forms. Seventeen parts of ammonia contain fourteen parts of nitrogen. The speaker thought the amount of nitrogen taken from the air by plants very small; clover, however, is an exception. Corn and wheat give no perceptible proof of having absorbed ammonia from the air. Clover is deep rooted, and brings up food from the subsoil, and therefore is one of the best plants for turning under as a green manure. When it has been tried side by side with stable manure it has brought better corn. This is an important and fertile subject, and it is not exhausted. We want to retain the fertility of our farms and to save the cost of commercial fertilizers. The margin of profit in their use is too small. Professor Johnson says it is a question whether farmers can afford to pay the prices of commercial fertilizers. Professor Atwater says farmers use too much nitrogen.

Mr. Moore said that Col. Wilson had told us to begin with thorough preparation and drainage, but he supposed that drainage was understood to be necessary. He could tell by the appearance of plants whether they were suffering from too much water. He believed twenty inches as good a depth for stirring the soil as two feet or four feet. He knew that strawberry roots have run four feet deep, but they would not have gone so far if they could have found food nearer. Thirty or forty years ago farmers were told to plough fifteen inches deep for field crops, and they tried it and found it did mischief by covering up the fertilizers from the air, and the result would be the same if Col. Wilson should induce them to do so now.

Col. Wilson asked, by what rule are we obliged to prepare soil with a plough? There are cases where the soil must be stirred four feet in depth to gain the best results, as in making lawns. The question is, what depth of soil will hold so much moisture that the rain which falls on it will be sufficient for the wants of the crop. Strawberries and grass need a great deal of water; grapes need very little. In California, with a drought that endures all summer, vines in the vineyard will ripen thirty pounds of grapes to the vine, whereas in our moist climate many a man kills his vines with kindness by too constant watering. The preparation of the soil is the first element, and must be adapted to the crops.

There are chemical reactions in the soil whereby nitrogen is released. The great source of nitrogen is the atmosphere, which contains eight parts of nitrogen to one of oxygen, and in every expiration of animals all the oxygen is absorbed and almost all the nitrogen given off. Carbon has a greater affinity for potash than nitrogen in the form of ammonia or nitrates. If you put water into cologne it becomes turbid; alcohol and water have greater affinity for each other than alcohol and essential oils, and when potash in a caustic form is mingled with composts containing ammonia, the organic carbon in the compost combines with the potash, and the ammonia is at once released and lost.

Josiah W. Talbot said, in regard to the statement of the essayist that substances must be reduced to atoms before they can be taken up by plants, that the expression is not a good one. They must be either dissolved in water or be in the form of gas, and it makes very little difference which. It is admitted that all plants

are half or more carbon, and the question comes up, how is carbonic acid formed? The oxygen in the atmosphere takes hold of the carbon in the plant. When we stir the ground we admit air and it comes in contact with vegetable matter and changes it into carbonic acid gas, which is plant food. Many articles are dissolved in the soil and so taken up. Plants will send their roots down to where they can get moisture; the roots of elms have been found twenty-five feet down. Strawberries will go down to where they can get moisture, and in preparing ground we must go so deep that the sun will not dry the roots. In reclaiming the marshes at Marshfield the ground is sometimes cultivated only by harrowing when it is liable to suffer from drought. The peaty formation should be cultivated deeper.

Mr. Hersey said that by an atom he meant the smallest division of matter possible, though he might, perhaps, have said in solution, but he thought the paper showed fairly that plant food should be in solution. He had been experimenting more than thirty years in regard to the depth to which it is best to plough, and had come to the conclusion that every man must learn his own soil, and stir it as its condition requires. His own soil does not give as good results when stirred deep as when stirred shallow. He had land trenched two feet and a half in depth many years ago, which was injured thereby and still shows the injury. We can only learn general principles here and must go home and apply them according to the condition of our soils.

Hon. Marshall P. Wilder said that in cultivation we must begin with draining as the foundation of all success. Soil must be ploughed according to its nature, and must be properly prepared, and plant food given at the right time. The finer the manure is comminuted, the better; and it should be applied near the surface. The late Hon. Benjamin V. French tried the experiment of burying manure fifteen inches in depth, and never heard from it. The speaker had found by experience that it is better to have manure fine and on the surface, and applied in autumn. Air and water administered at the right time are the great constituents which cause growth.

William H. Hunt said that it is the experience of every farmer that it is difficult to get sufficient fertilizing material. Near Boston it is very expensive, and away from the city, with all the stock that can be kept, it is difficult to get enough. There is not suffi-

cient stable manure to go over the country. At Concord it costs eight dollars per cord, and the question is, whether to buy that or chemical fertilizers. He had bought and manufactured the latter largely, and we must resort to them. Dr. Nichols said that bone and potash make the cheapest and best fertilizer; ashes is the best form of potash, but sufficient cannot be had, and we must use muriate of potash. Farmers who want only a small quantity of chemical fertilizers would do better to buy them already mixed; but those who use a large quantity should buy the materials, and mix them. They cannot afford to use guano. We should plough about as deep as we can manure; in ordinary farm culture we seldom go down a foot; the speaker ploughs from five to eight inches in depth.

The Chairman of the Committee on Publication and Discussion gave notice that, on the next Saturday, Josiah W. Talbot would read a paper on "Sports Physiologically Considered."

BUSINESS MEETING.

SATURDAY, March 31, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

E. W. Wood, Chairman of the Fruit Committee, reported in regard to the vote concerning fruits offered for Prospective Prizes, which was referred to that Committee at the meeting on the 3d of March, that it is inexpedient to take any action. The report was accepted.

The meeting was then dissolved.

MEETING FOR DISCUSSION.

SPORTS PHYSIOLOGICALLY CONSIDERED.

By JOSIAH W. TALBOT, Norwood.

Mr. President and Members of the Horticultural Society:

In presenting the following paper on Vegetable Sports, permit me, in justice to myself, to say that I lay no claim to new discov-

eries in vegetable physiology, but I simply present the facts and principles which I have gleaned from the best authors in our valuable library.

To call a natural phenomenon a *sport*, is to admit our ignorance of the natural laws by which it was produced. To be satisfied with that term evinces a willingness to remain ignorant. But such phenomena are very common. When, for instance, a branch upon the stock of a rose, or any other shrub or plant, produces a blossom essentially different from the others, it is called a sport. When, in grafting, the result is different from what we had reason to expect, we call it sporting. When the green leafed laburnum was budded with the golden, and the shoots below the bud, and even those from the roots were variegated, the new variety thus obtained was called a sport. So, when the yellow striped jessamine was grafted on the white, and the smaller leafed abutilon was grafted on the larger leafed, the two new varieties thus obtained were called sports. When, in Amherst, N. H., a large Baldwin tree, originally grafted near the ground on a Russet stock, threw out a shoot twenty feet above the graft, bearing apples that seemed to be a cross between the Baldwin and Russet, it was called Whiting's Sport, after the owner. Tradition tells us that more than a century ago, buds of the Golden Sweet and Rhode Island Greening, being split and their halves united, produced the well-known apple, one side of which is sweet, and the other sour. This apple has always been called a sport. These are a few of a large class of phenomena which, appearing to be contrary to natural laws, have been called sports. The term, however, is an unfortunate one. Nature never sports. All her laws are immutable. It is only when we cannot comprehend them that she *appears* to sport. Cases like the above, connected with grafting, cross-fertilizing, or hybridizing, will never be perfectly understood until men better understand the laws of vegetable anatomy and physiology. The advance made in this direction within a few years has already explained many of the mysteries of former times; and is it not reasonable to expect that scientific men, availing themselves of past discoveries, with the improved apparatus and opportunities of the present, will soon be able to trace what are now called sports, to natural causes? But let us bear in mind that the practical man, who carefully observes and records natural phenomena may be the scientific man, whatever he may be called.

The better to learn the origin, and understand the nature of sports, I wish to call your attention to a few familiar, but well-established physiological facts and truths. It is not long since the most absurd and contradictory views prevailed in regard to the circulation of the sap. That most trees and plants derive a large part of their nourishment from the soil, will not be questioned. Nearly all writers of note now admit that the crude sap ascends from the roots, through the sap wood, to the upper side of the leaves, where it is elaborated by coming in contact with the air, exhaling the superfluous water and oxygen, and inhaling carbonic acid. It then passes into the veins on the under side of the leaves, to be conducted into the chlorophyl vessels in the bark, where it is digested and assimilated on its way into the cambium, where it forms the protoplasm or life principle which circulates to every part of the plant, much as the blood circulates in the animal system. So well are botanists and physiologists agreed upon this subject, that controversy has nearly ceased. From this we obtain an idea of the source of the protoplasm, which originates not only all sports, but all growth in plant life. Another class of well established facts which we must understand before we approach the subject of sports, relates to the *cell structure* of plants. All plants originate in, and are composed of, minute cells. Every *natural* plant or tree came from *one* parent cell, which had the power of multiplying itself and building up the whole plant or tree. From every parent cell in a plant or tree, whether in root, branch, bud, or leaf, may be developed another plant or tree, which will be true to its kind. No *natural* plant or tree can of itself alone ever change its kind. On this fact depends the permanency of varieties. Keeping these facts in mind, we will now consider the *formation* of the cells. All writers admit that every cell is formed in the cambium by the protoplasm. According to their description, the protoplasm is one of the most wonderful agents in the world. They assure us that it has an inherent power of motion as persistent and independent as the beating of the heart, and even more so, for while the heart is always confined to the same relative spot, the protoplasm changes its locality and performs various kinds of motions, and seems to be endowed with a wisdom to foresee and plan, and a skill to execute the most varied operations. It not only forms the cells, but changes their forms to make tubes and vessels,

woody fibre, bark, buds and leaves; secretes the gum, starch, sugar, and all the materials that enter into the composition of plants; produces the most delicate blossoms, the most delicious fruits, and finally, to perpetuate its kind, inserts in every specimen of fruit a little embryo of itself in the well protected seed. All this is ascribed to the protoplasm. Men witnessing this wonderful display of wisdom and skill everywhere seen have called it *Nature*, and bowed in reverence; but let us rather view it as the handiwork of the Infinite One, whose wisdom designed, whose power executes and upholds, and whose boundless love pervades the whole. Or with the poet, exclaim,—

> "All are but parts of one stupendous whole,
> Whose body Nature is, and God the Soul."

But that protoplasm is the agent by which all vegetable growth is carried on, must be admitted. By the improved microscope, we can actually witness the wonderful process. We can see the first step toward the formation of a cell. We can see the protoplasm in the cambium, as it forms itself into a little globe or ball to become the nucleus of the future cell. We can see it begin to rotate and take form, as it secretes the substance with which it surrounds itself with a cell wall as perfect as the shell of an egg. Thus the nucleus, the cell sap, and the cell wall, constitute a *parent* cell. The nucleus is simply living protoplasm, which, as soon as the first cell is completed, divides itself into two parts, each taking an end of the cell, begins its rotary motion, divides the cell wall, and from the half each forms a new cell as perfect as the first. Thus from one cell two are formed, each to be again divided, and thus on to infinity. But when a sufficient number of cells are formed, one above another, a new work commences, with which we are particularly interested. The protoplasm in the perpendicular row of cells begins to absorb the transverse septa or end walls which are in contact with each other, and joining the side walls together forms tubes or sap vessels; then passes up through the tubes thus formed and uniting recommences its work of cell building to complete the plant or tree. It is the *union* of the protoplasm or the contents of these cells as it absorbs the cell walls between them and recommences cell building, that gives the key to the origin of sports. It is a process which is constantly going on in plant growth. Beyond the simple formation of cells, this union seems to be the means of the most important changes.

To illustrate: The grains of pollen in a blossom are admitted to be independent male cells, which may be removed from one plant to another. In the same blossoms where the male cells are formed, are the ovules or female cells, which cannot be removed without destroying them. These male and female cells are not independent parent cells, *i. e.*, they cannot by division form other cells. *Separately* they can do nothing toward building up the tree, but soon perish. But bring the pollen or male cell in contact with the ovule or female cell, and they at once absorb the cell walls between them, unite their contents, and together form a new cell, which is the embryo or parent cell of a new plant. In this way every seed is formed by the union of the contents of two cells. And here we may see how no plant can, of itself, ever change its kind. If the pollen, or male cell, uniting with the female cell be of the same kind, then the embryo or seed cell must be the same, and the plant will be the same. But let the pollen or male cell be of a different variety, and although they will unite in the same way, yet the embryo or seed cell will be unlike either. It will be a mixed or hybrid cell, and the plant coming from it will be like it. Thus we see that all hybrids come from the union or mixing of the contents of two cells. The same is true of all cross-fertilized seeds. Two cells of different varieties unite to form a seed cell; hence the term "variety hybrid," applies to every crossed variety.

Now, we wish to examine this union of cells a little more. When two cells thus unite, each contains a nucleus which appears to be little more than a small collection of protoplasm. But what gives this little particle of protoplasm in the male cell the power to produce such different results when uniting with female cells of different varieties? Or, in other words, what *determines* the *kind* of the embryo cell thus formed? In a natural tree, isolated from all others, every seed or embryo will be true to its kind. But in a grafted tree bearing several kinds of fruit, perhaps no two seeds will produce the same kind. Now every nucleus or primordial cell is formed in the protoplasm, and it would seem that the protoplasm should determine the kind, but this is not the fact. Neither is it the root that affords the sap, nor the leaf that elaborates it, nor the protoplasm formed from it. I have a natural pear tree, which, many years ago, was grafted with the St. Michael. When that pear cracked so badly, I grafted it with the Dunmore. Not satisfied with that fruit, I grafted it again with

the Anjou. Thus, I have four kinds of pear wood growing one above the other. The wild stock furnishes all the sap that passes up through the four kinds of wood, which is elaborated, digested, and assimilated by the Anjou leaves and branches, and forms protoplasm in the cambium of the Anjou top. It is certainly Anjou protoplasm, for it forms Anjou cells, buds, fruit, and wood. But this same Anjou protoplasm passes down a little lower, and forms Dunmore cells, buds, fruit, and wood; still lower, it forms St. Michael cells, buds, fruit, and wood; lower still, the the wild fruit of fifty years ago is found. And this all takes place when there are only Anjou leaves on the tree. Now when the protoplasm leaves the Anjou top, it is full of primordial cells formed there, which, if matured there, would be Anjou. What changes their nature as they pass down? I come to the conclusion that each kind of wood must have an inherent power to determine its own kind of fruit, and that the nuclei or primordial cells have their kind determined by the wood where they are *matured*, and not where they originated. Every kind of wood imparts something to every parent cell matured in it that determines what kind of fruit the tree coming from it shall bear. And every tree coming from such a cell must be true to its kind. Now if there is any way by which the contents of two cells, determined by different kinds of wood, should be united, would not the union be a hybrid? We have already seen that such a result follows in hybridizing and cross-fertilizing. We have also seen that in building up a tree, the cells often, yea, constantly, absorb the cell walls between them, and unite their contents, and proceed to form new cells by their united contents. Now we are constantly bringing such different cells in contact by the process of grafting, and it is in grafted trees that sports are generally, if not always, found. A cell in a scion is placed in contact with a cell in the stock; they absorb the cell walls between them, unite their contents, and these proceed to build a strain of wood different from either; in time, this blossoms and bears fruit, uniting the qualities of both scion and stock. It is a graft hybrid, but is called a sport. I think all sports come from a *union* of cells of different varieties. We may not always trace this. As in the animal kingdom, the mixed strain may reach far back—sometimes over several generations—so in plants; the strain may not become apparent for years, but when it appears it gives a new variety. But there is another

union of cells to which I wish to refer. A bud is virtually a single parent cell in its winter costume, with its spring ration enclosed. These bud cells may be split, and the halves of different ones united, thus mixing their contents as effectually as in hybridizing. Mr. Meehan assures us that he has done it. During the last season, I split the buds of several kinds of apples, and united them, and have three united buds living. I cannot tell what kind of fruit they will bear, but I know that halves of different buds united and grew well. This is a union of different cells, and I see no reason why their substance did not unite to form a parent cell which multiplied itself to build up the shoots just as any other cell does, and I cannot see why it will not be a mixed or hybrid wood, and bear a mixed or hybrid fruit. If so, I shall not call it a *sport*, but a graft hybrid. And such are all sports. They are hybrids resulting from the union of different cells. This certainly applies to the variegated laburnum, jessamine, and abutilon, which we know were the result of grafting, and I think equally well to the rose, the apple, and all other sports. I come to this conclusion from the truths and principles found in the works of the most distinguished authors in our valuable library. Most of these authors speak of sports and graft hybrids, but none attempt to account for them except Ex-President Clark of our own college, and he, rather doubtingly, in his report for 1870, says: "It may be possible that a part of a cell of the scion may unite with a part of the cell of the stock, and form a kind of mechanically crossed cell, capable of reproducing itself in infinite variety." This "infinite variety" is foggy. If he had said, capable of producing a *new* variety, it would have been nearer the truth. But if he had considered what he had already stated about the union of cells by the absorption of their transverse septa, he would have seen that it is not necessary to take *parts* of cells, but that by simply bringing cells of different varieties together, they will often absorb the intervening cell walls, unite their contents, and form a mixed cell producing a new variety, and all that is mechanical about it is the method by which the cells are brought in contact. From the foregoing, I conclude that all vegetable sports are *hybrids*, produced by the natural union of cells of different varieties, and that when more familiar with the subject, we shall no longer call them Sports but Hybrids.

DISCUSSION.

Hon. Marshall P. Wilder said that he had been more interested in the paper just read than he expected to be. He had heard a good deal about cell matter, which he had not intelligence enough to understand; but Mr. Talbot had so systematized his facts in regard to physiology, and stated them in such a sensible way, as to make his paper a remarkable one. His method of accounting for the production of four different kinds of wood in the pear tree, by the cell being *matured* in the wood formed, the speaker thought correct. We all know how cells are produced and conjoined, but he had not so well understood the process by which sports are produced, and that whether they are called hybrids or sports, the process is the same. He had had much experience in producing new varieties, and some sports which he has fixed may have come from such a union of cells as the essayist had described.

D. W. Lothrop said that he had been exceedingly interested in the paper. The subject is very complicated—as much so as anything in science, except that of soils. Many German writers seem to be trying to explain old mysteries by new phrases. The moment you can produce a sport, you show that you understand the laws which govern it. If we cannot get positive evidence on the subject, we may get negative. There is no certainty in regard to sports; when we arrive at certainty regarding them, they cease to be sports. It makes no difference what name is given to them. The speaker has a grafted tree, on which all the grafts have shown themselves the same as he put in, except one branch, which has not yet borne, is different in leaf, and will probably prove a sport, or what Professor Gray would call a bud variety. But such phenomena cannot be produced at will. The cell process does not make it clear how the sweet and sour apple was produced. Mr. Meehan's process, by splitting the graft through the bud, is legitimate and natural, and can be effected, as is known. Mr. Coxe (View of the Cultivation of Fruit Trees, page 22,) says he has seen an apple in which the properties of the Newtown Pippin and a Russeting were mixed by the accidental intermingling of the branches of two trees growing in an orchard at Trenton, N. J.; one end of each apple was strongly marked externally by the character of the Russet parent; the other equally resembled the Pippin, and the flavor and juice of each end corresponded exactly with its external appearance. Here is extraneous influence, from

pollen, or otherwise, affecting the *fruit*, and it seems to be accidental or abnormal in nature, and could not be produced at will. We sometimes see an apple shaped like a pear; this is a sport not explained by the cell process, and which nobody can produce. It may be that where two branches from two trees come together, the pollen may have fructified and affected the shape of the fruit (not the seed) the same year.

Mr. Talbot did not believe in accidents in nature. When we understand the laws which govern variations, it is not proper to call them sports. The best authorities speak of species hybrids, or mules, and variety hybrids or crosses. He did not believe in bud variations; a bud is a cell with other appendages, and the vital part is a single cell, which divides in the spring and carries on growth. He could not see how the pear-shaped apple could be produced by pollen, but by combining one cell with another it could be produced. Hybridizing was formerly looked on as being as mysterious as these things are thought now. He brought up the subject to call attention to facts recorded from twenty to forty years ago.

C. Terry asked how a bud could be split without destroying it.

Mr. Talbot said that he split twelve buds, and that in three cases they united, and are now living. In two cases where he joined halves of buds on a scion, and inserted the scion in another stock, they did not live. The foliage produced by the split buds is slightly different from that of the stock. The contents of the buds have united.

Charles M. Hovey denied that all sports are hybrids, and said that it is folly to assert it. If a bud is cut in the germ, it will be destroyed. The flowers now in the fruit buds were formed last summer, and the wood buds the same. There is an infinitesimal point in a seed — of a cucumber, for instance, — which, if cut through, the germ will be destroyed. The difference between a hybrid and a cross is that, in the former, two species are united, and in the latter, two varieties. The product of the former is termed a mule, but sometimes it will produce seed. When we cross-fertilize a camellia or a strawberry, we get something between the two varieties crossed. An oak throws out a variegated leaf; where did it get the white leaf? A chrysanthemum may be propagated for ten years by cuttings, and not by seed, and by and by a yellow flowered plant produces a white one, and the two come

out simultaneously. The Browallia will sometimes produce a branch with white flowers. These are all things of which we know not how they are done, but the speaker hoped we might find out. Some things are yet unfathomable; we cannot find out the law by which a wild stock, when grafted, produces eight or ten varieties of fruit, and all distinct. Van Mons did not believe in hybridizing; why did his seedlings vary?

Mr. Talbot replied to Mr. Hovey's last query, that Van Mons planted the trees which produced his seeds alongside of other varieties.

Mr. Wilder agreed with Mr. Talbot that Van Mons must have planted his trees in his garden with other varieties.

Mr. Hovey said that geraniums and other plants grown in greenhouses where there are no other varieties, will vary when grown from seed. Nature has provided against the chance of flowers not being fertilized, by a surplus of stamens, a sin all the Rosaceæ, and there is no need of foreign fertilization; three-quarters of them do their own fertilization. Variations take place without regard to hybridization, not only in the vegetable world, but throughout creation.

William C. Strong was called on, and said that he was not inclined to speak, because he felt the danger of expressing crude opinions. He felt under obligations to the essayist for his paper, but was not ready to follow it. As regards hybridization by different kinds of protoplasm producing the different varieties in seeds, we may, perhaps, agree. But to divide, and afterwards to cross in an artificial way, admits of very grave doubts. To split a single cell would destroy it.

Mr. Talbot said that Mr. Strong did not make the distinction between protoplasm and the beginning of a cell. One single cell divides and makes other cells, called the parent cell. If we can divide that and unite another half cell with it, it makes but a single cell.

Mr. Hovey asked Mr. Talbot whether he had ever attempted to divide a fern spore.

Mr. Talbot replied that he had not, and added that every seed is a compound cell.

Mr. Strong controverted the point made by the essayist, that nature never changes without the introduction of a new element, and that there can be no variation but by the union of two varie-

ties. Protoplasm may be modified. Sports are found most frequently on grafts, as in the case of the four kinds of pears on one stock, and are not caused by hybridization, but the nature of the plant is changed. Men change by age; why should not plant cells grow larger by cultivation? The condition of the soil changes; the color of a coleus may be heightened by the soil.

Leander Wetherell quoted a remark made by Professor Agassiz at a farmers' meeting, that the term hybrid is properly applied only to the intermixture of two species; when two varieties are intermixed, it is a cross. The speaker urged the necessity of using words with exactness and accuracy.

Mr. Hovey said that pears and other fruits are generally self-fertilized, though Darwin thinks self-fertilization insufficient. Red clover and white never cross. Nature has done everything to produce self-fertilization, so that there should be no failure in the continuation of any plant.

Mr. Talbot asked why, if any accident should occur, varieties should not get mixed up? The laws of nature prevent the red and white clovers from crossing.

Benjamin G. Smith, Chairman of the Committee on Publication and Discussion, announced that this would close the meetings for discussion the present season.

President Hayes thought it proper that the Chair should express the thanks of the Society to the Committee on Publication and Discussion, from whose action it has received so great advantage, and it was pleasant to him to bear witness to the benefit which these discussions have conferred, not only on those who have attended them, but on the whole country. Never before has the Society done so much for the diffusion of information on horticulture. All are not educated up to the same plane, and this morning we have been groping into Nature. He congratulated the Society on what had been accomplished at these meetings, and said that since their commencement, the Society had been especially indebted to Ex-Presidents Wilder and Strong for the part they had taken in sustaining them.

Mr. Wilder said that his heart was alive to this subject, and he thanked the President for his constant attendance at the meetings, and the Committee for the zeal and energy that they had shown. The reports have been distributed through the country every week, and have been largely copied in the journals of the day. Great as

have been the benefits of our exhibitions, the Society has never done anything so popular as the holding of these useful and instructive meetings. If we could not by this means procure the information they have afforded, we might be unable to obtain it at all. Mr. Wilder said that he should not attend these meetings a great while, but urged the Society to go on with them through coming time; it is in the right way, and should follow it.

Rev. A. B. Muzzey said that as one of the oldest members of the Society, and as a former member of the Committee on Publication and Discussion, he thought it but justice to the Society, and to those who have had charge of the meetings, to say that never before have they been so successful, so well attended, and productive of so much advantage. Never before have we been honored with the constant presence of the President of the Society. The Committee must have spent a great deal of time in perfecting their arrangements, and have never had so much success in selecting good essayists. The speaker was delighted to see that the Society has the coöperation of the community in its efforts to diffuse information on horticulture. He offered the following vote:

Voted, That the thanks of the Society be given to the President, the Hon. Francis B. Hayes, for his constant presence at the discussions, and the impartial, courteous, and faithful manner in which he has presided over these meetings. Also, that our thanks be expressed to the Committee on Publication and Discussion for their wise selection of readers and the valuable papers given us through the season. Also, that we express our thanks to our Secretary for his admirable reports of the meetings and his devoted services in all his duties, in which he has labored to the detriment of his health; and we express our hope that he may, by rest and recreation, be restored to pursue his invaluable work.

The vote was unanimously passed, and the meeting then adjourned without day.

A HISTORY

OF

AMERICAN HORTICULTURE.

The attention of Trustees and Librarians of Public Libraries, and of Horticulturists generally, is called to the History of the Massachusetts Horticultural Society, for fifty years, from its foundation in 1829. This work will be found of general interest, as the introduction comprises a sketch, much fuller than exists elsewhere, of the History of Horticulture in the United States, from the settlement of the country to the foundation of the Society, and the history of the Society onward is, in the language of President Hovey, in his address at the dedication of the present Hall of the Society, "the History of Horticulture in our country." It is handsomely printed, on an extra quality of paper, and embellished with a fine steel engraving of Gen. H. A. S. Dearborn, the first President, and heliotypes of the two Halls erected by the Society. Among other interesting matters, it contains an account of the foundation by the Society of Mount Auburn Cemetery, the parent of all similar cemeteries in the country.

The work is furnished to members of the Society, at cost, $2.50. and to others than members for $3, but will be supplied to public libraries and booksellers at the same price as to members. Please address the Secretary of the Society, at Horticultural Hall, Boston.

ROBERT MANNING,

Secretary.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

FOR THE YEAR 1883.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1884.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1883.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1884.

The Committee on Publication and Discussion, take this opportunity to repeat what they have heretofore stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature, in the papers and discussions now or before published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly. The award of a prize or gratuity for an Essay is not to be understood as implying that the Committe approve it in every particular, but only that they believe it calculated, *on the whole*, to promote the science or art of Horticulture.

BENJAMIN G. SMITH, *Chairman.*

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 7, 1883.

A duly notified stated meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

Hon. Marshall P. Wilder, President of the American Pomological Society, presented a circular announcing that the Nineteenth Biennial Session of that Society would be held in Philadelphia, September 12, 13, and 14, and moved the appointment of a delegation of twenty-five from this Society, of which the President should be chairman, to attend the meeting, the delegation to have power to fill vacancies in their number. The motion was carried, and Mr. Wilder, Robert Manning, and E. W. Wood, were appointed a Committee to nominate delegates.

John B. Moore moved that Ellwanger's "Treatise on the Rose" be made the standard of classification of all roses exhibited for the Society's premiums. The motion was referred to a Committee consisting of Mr. Moore, William H. Spooner, E. W. Wood, J. H. Woodford, and Edward L. Beard.

The appropriations recommended by the Executive Committee at the meeting on the 4th of November, 1882, were taken up, and voted by the Society, as follows:—

For Prizes and Gratuities,

For Plants and Flowers, ...	$1500
" Fruits, ...	950
" Vegetables, ...	500
" Gardens and Greenhouses, . . .	100

For the Committee on the Library, for the purchase of magazines and newspapers, binding of books, continuing the card catalogue of plates, and incidental expenses of the Committee, ...	400
For the Committee on Publication and Discussion, ...	150
For the expenses of the Committee of Arrangements, ...	300

Dr. HORATIO C. MERIAM, of Salem, and
AMOS E. HILL, of Belmont,

having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

Adjourned to Saturday, May 5.

BUSINESS MEETING.

SATURDAY, May 5, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

The Committee appointed at the last meeting to select some book as a standard authority for the guidance of committees and exhibitors in the classification of roses, reported through their Chairman, John B. Moore, that they had examined various works on the rose, and after careful consideration unanimously recommended to the Society to adopt as such standard, Ellwanger's "Treatise on the Rose."

The report was unanimously accepted and adopted.

The President communicated a letter from the President of the Imperial Russian Horticultural Society, containing more fully the information received by telegraphic cable, on the 10th of March, that the International Exposition of Horticulture and Congress of Botanists and Horticulturists, fixed for the present month, in celebration of the Twenty-fifth Anniversary of that Society, had been postponed until next year, on account of the coronation of the Emperor and Empress of Russia at Moscow during the month,

and expressing the hope that the representatives of this Society would be present next year.

Adjourned to Saturday, June 2.

BUSINESS MEETING.

SATURDAY, June 2, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

C. H. B. Breck announced the decease of Parker Barnes, one of the oldest members of the Society, and moved the appointment of a committee to prepare memorial resolutions. The motion was carried, and the Chair appointed as that Committee, Mr. Breck, William H. Spooner, and John B. Moore.

Hon. Marshall P. Wilder exhibited two colored plates of a large number of double and single varieties of Tuberous Rooted Begonias, and spoke of the recent great improvement in these plants, and of their value for the summer decoration of gardens and ornamental grounds.

The following named persons having been recommended by the Executive Committee were, on ballot, duly elected members of the Society:

FRANCIS W. MORANDI, of Malden.
GEORGE W. WELD, of Newport, R. I.
SAMUEL A. D. SHEPPARD, of Newton.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, July 7, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee appointed on the 7th of April to report a list of delegates to the meeting of

the American Pomological Society at Philadelphia, on the 12th, 13th, and 14th of September, reported the following:

The President, Hon. Francis B. Hayes, Chairman.

Hon. Marshall P. Wilder,	Warren Fenno,
Charles M. Hovey,	John C. Hovey,
James F. C. Hyde,	E. P. Richardson,
William C. Strong,	James W. Clark,
John B. Moore,	Aaron D. Capen,
Benjamin G. Smith,	Henry W. Wilson,
C. H. B. Breck,	John A. Demar,
E. W. Wood,	Nelson B. White,
P. Brown Hovey,	John H. Moore,
Charles F. Curtis,	Charles N. Brackett,
J. W. Manning,	William H. Spooner,
O. B. Hadwen,	Warren Heustis.

The report was accepted, and the Committee was empowered to appoint substitutes for such delegates as might be unable to attend.

Edward L. Beard said that the project of holding a grand exhibition during the year 1884, not only of horticultural products but of plant houses, heating apparatus, and all other objects appertaining to horticulture, had been discussed by some of the members of the Society, who believe that, occupying as it does a foremost place among American horticultural societies, it should take such a step in advance. He thought it probable that contributions could be secured from Europe, and felt certain that such an exhibition would be the means of diffusing much needed information on horticulture. On motion of John B. Moore, seconded by William H. Spooner, the following named persons were appointed a Committee to consider the subject: Edward L. Beard, Marshall P. Wilder, H. H. Hunnewell, F. L. Ames, Charles M. Hovey, John B. Moore, William H. Spooner.

The following named persons having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

Spencer W. Robinson, of Boston.
Rhodes Lockwood, of Charlestown.
Francis C. Foster, of Cambridge.

Adjourned to Saturday, August 4.

BUSINESS MEETING.

SATURDAY, August 4, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Robert Manning was added to the delegates to the meeting of the American Pomological Society.

Hon. Marshall P. Wilder announced the decease of Dr. John A. Warder, of North Bend, Ohio, a Corresponding Member of the Society, and moved the appointment of a Committee to prepare memorial resolutions, and Mr. Wilder, Charles M. Hovey, Robert Manning, and Leander Wetherell were appointed as that Committee.

On Mr. Wilder's motion, also, a Committee, consisting of Aaron D. Capen, E. W. Wood, and Charles N. Brackett, was appointed to prepare resolutions in memory of Lemuel Clapp.

David W. Lothrop announced the decease of George Craft, and moved the appointment of a committee to prepare a memorial, and Mr. Lothrop, John C. Hovey, and John G. Barker were appointed as that Committee.

Agreeably to the Constitution and By-Laws the President reported the following Committee to nominate suitable candidates for the various offices of the Society for the year 1884: Hon. Marshall P. Wilder, Chairman, Henry P. Walcott, William H. Spooner, Henry Ross, George Hill, Joseph H. Woodford, Edward L. Beard.

GEORGE A. PURDIE, of Wellesley Hills, and
JAMES H. BOWDITCH, of Brookline,

having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

Adjourned to Saturday, September 1.

BUSINESS MEETING.

SATURDAY, September 1, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee appointed at the last meeting to prepare resolutions in memory of Dr. John A. Warder, reported as follows:—

The Committee appointed to prepare resolutions on the death of Dr. John A. Warder, a Corresponding Member of this Society, beg leave to report:

Dr. Warder died at his residence, North Bend, Ohio, July 14, 1883, aged seventy-one years. He was born within the limits of Philadelphia, and was for many years a beloved physician in Cincinnati, until his removal to his farm, a part of which was formerly President Harrison's. He was a Vice-President of the American Pomological Society, an Ex-President of the Cincinnati Horticultural Society; President of the Ohio Pomological, now the State Horticultural, Society; founder and President of the American Forestry Association, until last year when it became the American Forestry Congress; and a member of many other associations. Dr. Warder was a student of nature, deeply interested in landscape gardening, and the improvement of our cemeteries, and also in the work of various scientific and educational institutions, and had been recently appointed by the United States Department of Agriculture, as Forestry Agent for the investigation of American Forestry; Therefore be it

Resolved, That in the death of Dr. John A. Warder, a Corresponding Member of this Society, we have to deplore the loss of one of nature's noblemen, unselfish and generous, devoting his whole life to the good of others. We recognize his fondness for scientific investigations, his contributions to various literary and medical publications, and especially his valuable works on American Pomology and American Forestry.

Resolved, That in this bereavement we have lost a man of fine social qualities, whose society was greatly enjoyed by all who knew him, and we would here express our heartfelt sympathy with the family of the deceased.

Leander Wetherell desired to add his testimony to the worth of Dr. Warder, whom he first met in Rochester, N. Y., about 1845. He knew him to respect and honor him. He was of Quaker ancestry, and his father entertained Audubon, William Bartram, and Nuttall, and they inspired the son with a love of nature and science. His publications on forestry, of which a list was printed in the August number of the "Journal of Forestry," are numerous, and

form almost a library on that subject; and it is an important question who shall fill his place in the study and investigation of that department of rural economy. He was chosen a Corresponding Member of this Society in 1869, and was a gentleman whom we all delighted to honor, and it becomes us to pay him the respect which he so richly deserved.

William C. Strong confirmed all that had been said by the last speaker, and in the resolutions, in praise of Dr. Warder.

Mr. Wilder said that Dr. Warder was a remarkable and most useful man, and that in his death he had lost a very dear friend, who always made the house of the speaker his home when he visited Boston, and who, when he was sick, came in loving kindness to watch over him not only in his home, but by his bedside in Washington.

President Hayes desired from his official position to acknowledge in behalf of the Society, the great worth of Dr. Warder, and the benefit conferred by him on the Society, which is indebted to him for instruction on a novel subject, and deeply deplores his loss.

The resolutions were unanimously adopted.

Aaron D. Capen, Chairman of the Committee appointed at the last meeting to prepare a memorial of Lemuel Clapp, presented the following:

The Committee appointed to take suitable notice of the death of Lemuel Clapp, respectfully report:

Lemuel, the son of William and Elizabeth (Humphreys) Clapp, was born in Dorchester January 21, 1815, and died June 15, 1883. He, with his brothers Thaddeus and Frederick, was largely interested in agricultural and horticultural pursuits. He planted with his own hand the seed from which the Clapp's Favorite pear originated.

It is not often that we have to record the death of one whose departure will be the occasion of greater sorrow in the circle in which he moved. The loss of his efforts in behalf of the Massachusetts Horticultural Society will be seriously felt.

He was beloved by his family and many personal friends, and highly respected by all who knew him, as a gentleman not only above reproach but above the suspicion of it. Many have made more show and noise in this world, but few have left it with a cleaner record.

AARON D. CAPEN,
E. W. WOOD,
C. N. BRACKETT,
} *Committee.*

Mr. Wilder said that he knew Mr. Clapp well as a worthy citizen of Dorchester. He was the last of three brothers noted for their excellent character and their skill as horticulturists. Although Thaddeus Clapp has the credit of producing the Clapp's Favorite pear, the seed of this and all the other fine seedling pears which have originated in the grounds of the Clapp brothers was planted by Lemuel. He is a loss to the community and especially to American Pomology.

The resolutions were unanimously adopted.

William H. Spooner, from the Committee appointed at the meeting on June 2d, to prepare resolutions in memory of Parker Barnes, reported the following:

Resolved, That in the death of Parker Barnes, the Massachusetts Horticultural Society has lost a member who for many years took a lively interest in its welfare and prosperity.

Resolved, That while we sympathize deeply with the family and relatives of the deceased, in this dispensation of Providence, we rejoice in the full belief that he has passed to a higher and more glorious state of existence.

Resolved, That these resolutions be entered on the records of the Society, and that a copy be transmitted to the family of the deceased.

C. H. B. BRECK,
Chairman of Committee.

Mr. Wilder said that he knew Mr. Barnes as a lover of Nature fifty years ago. He afterwards was much interested in the dahlia, of which he had one of the most extensive collections and was one of the most successful cultivators. Later he became a seedsman, and was instrumental in the distribution of both seeds and plants of beautiful flowers.

Robert Manning, the Librarian, took from the library a little book, presented by Mr. Barnes on the 10th of October, 1882— "The Young Florist, or Conversations on the Culture of Flowers and on Natural History, with numerous engravings, from original designs: By Joseph Breck, Superintendent of the Horticultural Gardens, Lancaster, Mass." It was published at Boston, in 1833, and bore the following inscription on a fly-leaf: "This book was the cause of the development of my love for flowers: Parker

Barnes, May 5, 1863;" thus forming an interesting memorial of the author and the giver, two of the oldest members of the Society.

The resolutions were unanimously adopted.

The Committee appointed at the last meeting to prepare resolutions in memory of George Craft, reported through their Chairman, David W. Lothrop, as follows:

The Committee appointed at the last meeting to present resolutions to the Society on the decease (July 21, 1883) of Mr. George Craft, of Brookline, would make the following report:

Resolved, That on the death of Mr. Craft, long a member of this Society, we would express our sorrow for the loss of one who, during the greater part of his life, took a deep interest in agriculture and horticulture, and in the various arts and sciences to which they are allied, holding for several years a place on the Flower Committee of our Society. In early life he was much interested in the cultivation and sale of ornamental trees and shrubs, and in a later portion of his life in that of flowers, particularly the Gladiolus, raising many fine seedlings thereof, in which industry he was very prominent, if not the pioneer, taking many prizes, certificates of merit, and several medals, as our annual reports abundantly testify. In the allied art of landscape gardening, he manifested much pride and pleasure, and exhibited the marks of his discriminating taste in everything of this nature which he undertook. But aside from his love of horticulture, the members of this Society, and those who knew him best, will remember him for his self-culture, industry, and ingenuity, his frankness and modesty, his cheerful companionship, his unsullied reputation, his interest in many philanthropic associations, and his general devotion to the higher elevation of man.

Resolved, That these resolutions be entered on the records of the Society, and that a copy be forwarded to the sister of the deceased.

D. W. Lothrop,
John C. Hovey,
John G. Barker,
} *Committee.*

The resolutions were unanimously adopted.

Hon. Marshall P. Wilder, Chairman of the Committee to nominate candidates for Officers and Standing Committees for the next year, reported a printed list, which was accepted and laid on the

table. It was voted that the Committee be continued and requested to nominate candidates in place of any who might decline before the election.

William H. Spooner announced that Charles H. B. Breck had declined a renomination as Chairman of the Committee of Arrangements, after having filled that important position acceptably and courteously for many years, and offered the following resolve, which was unanimously passed:

Resolved, That the thanks of the Society be presented to Charles H. B. Breck, for his long term of service, of seventeen years, as Member and Chairman of the Committee of Arrangements.

The following named persons, having been recommended by the Executive Committee as members of the Society, were, on ballot, duly elected:

DANIEL WRIGHT, of Lowell.
HOSEA WATERER, of South Natick.
Mrs. MARY LANGMAID, of Somerville.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, September 22, 1883.

A special meeting of the Society was holden at 11 o'clock, in accordance with the following request:

BOSTON, September 18, 1884.

To Hon. FRANCIS B. HAYES,

President of the Massachusetts Horticultural Society:

Agreeably to Section XI of the Constitution and By-Laws of the Massachusetts Horticultural Society, the undersigned twelve members request you to call a special meeting of the Society, to see if the Society will authorize the execution of a mortgage on its estate on Tremont Street, Boston, between Bromfield and Bosworth Streets, for $60,000 for five years, at 4½ per cent interest.

Marshall P. Wilder,	John Fillebrown,
Charles H. B. Breck,	Robert Bottomly,
John G. Barker,	M. W. Chadbourne,
George Hill,	D. A. Martin,
George W. Fowle,	David Allan,
Robert Manning,	Samuel G. Damon.

In compliance with this request the President ordered that a Special Meeting be held on Saturday, September 22, at 11 o'clock, for the purpose therein mentioned, and that the notice required by the Constitution and By-Laws be given by an advertisement signed by the President, which was accordingly published three times in the Daily Evening Transcript, and three times in the Boston Daily Advertiser, and a notice of similar tenor was posted in the Library Room.

At this meeting the President was in the chair, and stated the object of the meeting to be to execute a mortgage and note, as mentioned in the call for the meeting. The mortgage and note were read in full by the President, and on motion of Aaron D. Capen it was unanimously

Voted, That Francis B. Hayes, the President of this Corporation, and George W. Fowle, the Treasurer of this Corporation, be, and they hereby are, authorized and directed to execute, acknowledge, and deliver, the foregoing mortgage as the free act and deed of this Corporation—to execute the note therein described, and transfer the policies of insurance as additional security, as therein set forth.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, October 6, 1883.

A stated meeting of the Society, being the annual meeting for the choice of officers, was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Recording Secretary stated that the requirements of the Constitution and By-Laws, in regard to notice of the meeting, had been complied with.

The President appointed William H. Spooner, George Hill, and Robert Manning, a Committee to receive, assort, and count the votes given, and report the number.

The polls were opened at five minutes past eleven o'clock.

Charles H. B. Breck reported from the Executive Committee a recommendation that the sum of $150 be appropriated for the deficiency in the appropriation for the expenses of the Committee of

Arrangements for the years 1881 and 1882, and the appropriation was voted by the Society.

William H. Spooner moved that a committee of three be appointed to consider and report what further regulations were necessary for the proper conduct of the exhibitions, and the preparation for and closing of the same, and especially to prevent the loss of articles exhibited. The motion was unanimously carried, and the Chair appointed as that Committee, William H. Spooner, Chairman of the Flower Committee, E. W. Wood, Chairman of the Fruit Committee, and C. N. Brackett, Chairman of the Vegetable Committee.

Robert Manning moved that a committee of three be appointed to consider what recognition should be made of the specimens of Lepidoptera shown by Ernest E. Fewkes at the Annual Exhibition. The motion was carried, and the Chair appointed as that Committee, George W. Humphrey, William H. Spooner, and E. W. Wood.

While the polls remained open, President Hayes spoke of the financial condition of the Society, congratulating the members on its improvement, and said that $6,000 of the floating debt had been paid during the year, and $3,000 would be paid in the present week, and it was hoped to pay $3,000 before the end of the year, thus clearing off the entire floating debt of the Society. He believed that the income in future would enable it to increase the amount appropriated for premiums, and at the same time to lay up something every year towards extinguishing the mortgage debt.

Hon. Marshall P. Wilder referred to the efforts made to secure the present site and building of the Society, and congratulated the members that the President had consented to serve another year, and also on its prosperity as shown by the statement just made by the President. He had known the Society for fifty years, and it had never before been in so prosperous a condition.

Rev. A. B. Muzzey spoke of his long connection with the Society and of the interest now felt in it, and of the opportunities which it affords not only for the sight of beautiful flowers and fruits, but for instruction in horticulture. It owes much to the continuance of the lives of many of its older members, with enthusiasm like that of the veteran Ex-President Wilder, who had just spoken. But all institutions depend on their head, and the speaker wished to

render all honor to him who now presides so ably and successfully over the Society, with a heart full of love and zeal for the promotion of horticulture.

President Hayes thanked the members for the flattering manner in which the mention of his services had been received, and said that having aimed to do his duty during the time he had filled the office of President he had wished to retire; but had been induced to continue another year. The success of the Society depends on the practical workers among its members, who, week after week, exhibit their flowers and fruits and vegetables, and among these he wished to give due praise to the ladies, from whom the men might well take example. He also spoke of the great value of the Library and of the labors of the Library Committee and the Librarian, in securing and making accessible to the members the most valuable works on horticulture and its kindred sciences.

Mrs. H. L. T. Wolcott wanted to urge on all the members of the Society, old and new, the importance of utilizing to the fullest extent the valuable library of the Society, and of remembering that the Library Room, in which they were assembled, is full of instruction—not only practical works but scientific. She was reminded of its wide scope by the fact that a member of the Corean embassy found here illustrations of the plants of his own country, and of articles from thence, displayed in the Foreign Exhibition now open in this city.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

EDWARD K. BUTLER, of Jamaica Plain.
THOMAS F. GALVIN, of Boston.
MARSHALL M. TIDD, of Woburn.
WILLIAM ROBINSON, of North Easton.
SAMUEL C. B. ROGERS, of Boston.
JOHN R. BALLARD, of Dedham.

The polls were closed at five minutes past twelve o'clock, and the Committee to receive, assort, and count the votes reported through their Chairman that the whole number was fifty-six, and that all the persons whose names were on the ticket presented by the Nominating Committee, were chosen. The report was accepted and the persons named were, agreeably to the Constitution and

By-Laws, declared by the President to have a majority of votes, and to be elected Officers and Standing Committees of the Society for the year 1884.

Adjourned to Saturday, November 3.

BUSINESS MEETING.

SATURDAY, November 3, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

The President, as Chairman of the Executive Committee, reported a recommendation that the Society appropriate the following sums for the year 1884:

For Prizes and Gratuities, ...	
For Plants and Flowers, ...	$1,750
" Fruits, ...	1,000
" Vegetables, ...	550
" Gardens and Greenhouses, . . .	150
For the Committee on the Library, for the purchase of magazines and newspapers, binding of books, continuing the card catalogue of plates, and incidental expenses of the Committee, ...	400
For the Committee on Publication and Discussion, ...	150
For the expenses of the Committee of Arrangements, ...	300

Agreeably to the Constitution and By-Laws the Report was laid on the table until the first Saturday in January.

Adjourned to Saturday, December 1.

BUSINESS MEETING.

SATURDAY, December 1, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Annual Report of the Committee on Plants and Flowers was read by William H. Spooner, Chairman.

The Annual Report of the Committee on Fruits was read by E. W. Wood, Chairman.

The Annual Report of the Committee on Vegetables was read by Charles N. Brackett, Chairman.

The Annual Report of the Committee on Publication and Discussion was read by Benjamin G. Smith, Chairman.

Robert Manning read his Annual Report as Secretary and Librarian.

These reports were severally accepted and referred to the Committee on Publication.

The Committee on the Library, the Committee on Gardens, and the Committee of Arrangements, asked further time to make their reports, which was granted.

William H. Spooner, from the Committee appointed at the meetting on the 6th of October to consider what recognition should be made of the collection of Lepidoptera, whose larvæ are injurious to vegetation, shown by Ernest E. Fewkes at the Annual Exhibition in September last, read a report with a unanimous recommendation that a First Class Certificate of Merit be awarded to the exhibitor. The report was accepted and the recommendation was adopted.

The President, as Chairman of the Executive Committee, presented the List of Prizes recommended by the Committee on Establishing Prizes to be offered for the year 1884, with the approval of the Executive Committee. Some amendments being suggested the report was laid on the table for one week, for further consideration.

Hon. Marshall P. Wilder, Chairman of the Committee on Large and Interesting Trees, reported that the Committee had gathered much interesting information on the subject, but, as it had proved larger than was anticipated, he moved that further time be granted to prepare for publication the material collected, and, also that John Robinson, Professor of Botany to the Society, be added to the Committee. Both these motions were carried.

Mr. Wilder also referred to the action of the American Pomological Society, at its recent session, in regard to improving and

simplifying the nomenclature of fruits, and read from his address as president of that society his views in relation to the subject. The following votes on the subject were passed:

Voted, That in all the exhibitions and publications of the Society, the nomenclature of fruits be conformed to that of the Catalogue of the American Pomological Society.

Voted, That exhibitors of fruits shall not be disqualified by using the present names at the exhibitions.

Edward L. Beard was added to the Committee on rules for the better conduct of the Society's exhibitions.

Benjamin G. Smith, Chairman of the Committee on Publication and Discussion, gave notice that the series of Meetings for Discussion the present season would commence on the next Saturday, with the reading of an essay by John J. Thomas, of Union Springs, N. Y., on "Live Hedges, for Protection and Ornament, and the Plants most suitable for them."

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

STILLMAN S. HOVEY, of Woburn.
ARTHUR HUNNEWELL, of Wellesley.
ALEXANDER GREENLAW, of Boston.
THOMAS W. DEE, of Mount Auburn.

Adjourned to Saturday, December 8.

BUSINESS MEETING.

SATURDAY, December 8, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Annual Report of the Library Committee, was read by William E. Endicott, Chairman.

The Annual Report of the Garden Committee, was read by John G. Barker, Chairman.

These reports were severally accepted and referred to the Committee on Publication.

The Schedule of Prizes for 1884, laid on the table at the last meeting, for consideration today, was taken up. Several amendments were proposed and adopted, and the Schedule was then adopted.

The President stated that a communication had been received from the Worcester County Horticultural Society, asking the co-operation of this Society in a movement to secure the exemption of horticultural societies from taxation. The subject was referred to the Executive Committee.

Adjourned to Saturday, December 15.

MEETING FOR DISCUSSION.

Hedge Plants and Hedges.

By John J. Thomas, Union Springs, N. Y.

In answer to the question, "Are live hedges to be recommended; and, if so, what plants are most suitable?" the writer of this essay desires to report his experiments performed during the past forty years with hedges, both for farm use and for ornament, and with several different hedge plants. In giving the results of these experiments, and placing each sort in the position of its real value, it will be necessary to point out the kind of treatment to which each has been subjected, as some may be valuable with one kind of management, and useless with another.

The deciduous trees and shrubs on which the experiments were performed, were the Buckthorn, Osage Orange, Honey Locust, Privet, and Barberry. The evergreens were the Norway Spruce, Hemlock, and American Arbor Vitæ. The Osage Orange was more extensively planted than any other; long lines of this hedge on farms, commenced from twenty to twenty-five years ago, being still in good order, and affording efficient protection against farm animals.

The earliest experiments made by me forty years ago, were with the Buckthorn. It has the special advantages of great hardiness, a naturally thick and hedgy growth, and easy propagation by seed. The young plants, which have a copious mass of fine fibrous roots, are easily transplanted, and there need not be a failure to grow of one in ten thousand, if the work is performed with reasonable care. In order to keep the hedge thick and within bounds, a moderate

amount of cutting back is requisite. But with all its advantages the buckthorn has a serious drawback. The growth is not stout enough to resist unruly animals, unless growing in a richer soil than farms generally possess. The annual cutting back, although moderate, is an objection to farmers; and they have generally preferred the more costly post and board fence, with no yearly care.

The buckthorn hedges which I have made, have cost about twenty-five cents a rod the first year, including the preparation of a strip of mellow soil five feet wide, the purchase of the plants, the setting, and occasional horse-cultivation to keep two feet of clean soil on each side. The yearly cultivation afterwards, and the annual cutting back early in spring, until the hedge had reached full size, was not over three or four cents a rod.

Although the buckthorn has nearly passed out of use as a hedge plant, on account of its inefficiency and want of real thorns, it is by no means impossible that it may be again extensively planted in future years, when cultivators find that it may be converted into an efficient barrier by enclosing two or three barbed wires extending its length through the interior, these wires, supported on occasional posts, being successively placed in position as the hedge increases in height, the branches growing around the wires and holding them immovably in position (Fig. 1). Gal-

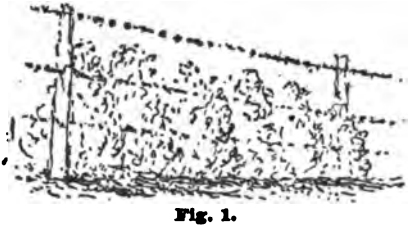


Fig. 1.

vanized wire should always be chosen on account of its durability, instead of painted wire, which is liable to be affected with rust in a few years.

I have planted many Osage Orange hedges, and given them different modes of treatment. They require more care in planting than the buckthorn, in the assorting of plants of equal size and vigor, and in the rejection of those of feeble vitality. If all are not of equal size, they should be assorted into at least two sizes, and those which are alike planted together. As with all other hedge plants, they should be set in a single line, double lines being more

difficult to keep clear of weeds and grass, while they possess no real advantage. About eight inches apart is a suitable distance to place them. The line of the hedge being a bed of fine mellow earth, they are carefully set with a stretched line. . For the first few years the ground must be kept well cultivated.

As the Osage orange is partly tender, it will not endure the winters at the north, unless on well-drained soil. I have often had occasion to observe its healthy appearance on dry, gravelly knolls after severe winters, while in adjacent wet and rich depressions it had been nearly killed down to the ground. Hence the importance of placing a good tile-drain within a few feet and parallel with the hedge. Thus protected from a wet subsoil, I now have good hedges twenty-five years old, the cold of winter having often sunk the thermometer ten or twelve degrees below zero, and in rare instances lower.

No hedge is more commonly mismanaged than the Osage orange. It is planted in the first place in imperfectly prepared ground; vigorous and feeble plants mixed together are placed in the line; cultivation is neglected, and weeds and grass are allowed to choke the growth; it is not regularly cut down in successive years, and when the cutting is performed, it is not done low enough to give a thick and impenetrable mass of branches at the bottom. Hence the common appearance of broken and irregular lines, instead of perfect uniformity. Where more careful attention is given, the hedge is nearly spoiled by allowing too much breadth at the top, as shown in Fig. 2; the heavy shade above causing meagre growth

Fig. 2.

and openings below. A better form is represented in Fig. 3; but an objection still exists with many hedges pruned into this shape, in *shearing* to a uniform surface instead of cutting back more irregularly, as shown in Fig. 4. The shearing causes a very thick

and short growth of leaves at the exterior, excluding the light from the inside and causing bare branches in the interior. Cutting

Fig. 3.

Fig. 4.

back more irregularly with a knife allows the growth of interior foliage and gives more health to the hedge. The sheared hedge presents an unnatural stiffness on ornamental grounds; cut back with the knife, if the operation is skilfully performed, it has more of the beauty of natural form. This is a matter which should be well understood, as the value of any recommended hedge plant depends on its proper management, and the Osage orange, and other hedges, have been pronounced failures by those who have mismanaged them.

For coarse farm barriers, hedges do not necessarily require the elaborate care just described. Another mode of treatment has been adopted in the Western States. The trees are trimmed and the main stems trained upright for a few years. They are then cut half off at the ground, and bent over in one direction at an angle of about thirty degrees with the ground (Fig. 5), trees being left

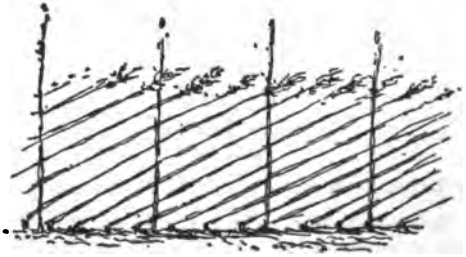


Fig. 5.

upright at distances of four or five feet, and the inclined ones are interwoven among them, a straight line of trees being thus formed. The tops are then all cut off about three feet high. New shoots spring up in abundance from the sides and stumps, and form an impenetrable growth. Sometimes as many as fifty limbs have been counted sprouting from a single tree the first year. The top of the hedge is cut back annually to within a few inches of its previous height. Hedges made in this way have no gaps.

Whenever a hedge becomes too high by long years of growth, it is well to adopt a similar but simpler mode of treatment, first partly trimming the trees with a light axe or hook with a long handle, then cutting them half off at the ground, and bending them over. A new growth will spring up and form a new hedge, as shown in Fig. 6. I have adopted this course with a hedge sixty rods long,

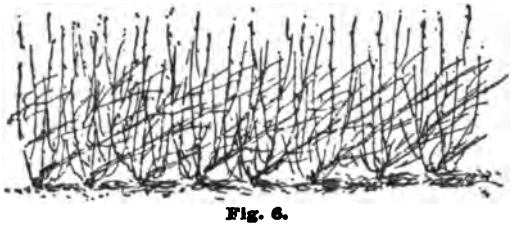


Fig. 6.

planted twenty-eight years ago on a distant tenant farm where personal attention could not be frequently given. It was set within eight feet of a parallel tile-drain, and it has been a perfect farm-barrier for more than twenty years.

The cost of the last described hedge, including the preparation of the ground, the price of the plants, the labor of planting, and the necessary horse-cultivation, was about twenty-five cents a rod the first year; and the three subsequent cuttings for the sixty rods cost about twenty dollars in labor, or, as an average, a little less than a dollar a year. But it was usually too tall, and it shaded and occupied too much ground to be recommended where land is valuable.

Ninety rods of Osage hedge, trained as represented by Fig. 3, cost about the same for planting, and for the first few years of cultivation, but more for annual cutting back. It was planted twenty-four years ago, and has been a barrier for about twenty years. The yearly cost of pruning, since it has reached full height, has been about four cents a rod for the first ten or twelve years, and of late

years, after it had become larger and higher, nearly double that sum. The cutting back was performed either with a stout hook having a handle two and a half feet long, or a short, stout scythe. Hedge-shears were too slow in their operation, and were adapted only to ornamental hedges; but even for these the knife was preferred, as already mentioned.

The Honey Locust has been extensively used for hedges of late years, being preferred on account of its hardiness. By selecting the seed from the most thorny trees, young plants are obtained well armed with thorns, and making very efficient hedges. The trees having a tall, slender, and not hedgy growth, require thorough cutting back to impart a thick mass of branches, and very few of the many honey locust hedges have been sufficiently cut back when young, to prevent openings at the bottom. Similar general treatment is to be given to the honey locust, in planting and rearing, as to the Osage orange.

Many hedges have been greatly injured by pruning after the summer growth had commenced, and sometimes the young plants have been thus fatally checked. But the fact is becoming better known that the pruning must be done in spring, before the buds swell, if vigorous growth is to be preserved. The only exception to this rule is with strong growing hedges that are likely to become too tall unless some check is given after they have reached full height, and this check is easily furnished by summer pruning.

Although the cost of planting and starting hedges is less than that of building a good board fence, as has been already shown, it must be admitted that they are not adapted to the management of ordinary farmers, who cannot be induced to give them the perfect and continual attention required to keep them in good order. This conclusion is fully sustained by observing how few have succeeded with hedges, and how many have allowed them to be ruined by neglect.

The evergreens which have been employed have been exclusively for ornamental screens and not for farm barriers. The Norway Spruce may be placed at the head of the list, on account of its rigid growth, hardiness, and the freedom with which it may be cut back. It will bear more shade than many other evergreens, and hence the interior of the screen is green with foliage. The cutting should be done with a knife and not with shears, for the reason already stated. Next to the Norway spruce is the Hemlock, which

exceeds the former in its lively green color in winter, while it is unexcelled in retaining interior foliage. It will bear pruning or cutting back to an almost unlimited extent, if the work is done in spring before growth commences. But it is not so stiff as the Norway spruce as a barrier. The American Arbor Vitæ, although much used, becomes destitute of foliage inside, and is browned by winter.

By the introduction of barbed wire an important change is likely to take place in planting hedges. Barb-wire makes a cheaper fence for its efficiency than any other material. A serious objection to it is the danger of animals being lacerated against the barbs before they are aware of its presence, the wire being nearly invisible. This objection may be obviated by enclosing the wires within a visible hedge. Another important advantage is the efficiency which may be thus imparted to small-growing hedge plants, as the Privet, Barberry, and small evergreens. These small growers will require but little labor in cutting or shearing, compared with that required for such large ones as the honey locust and Norway spruce. After being once established, such hedges would become handsome ornaments. The Purple Barberry, for example, would present an attractive appearance during a large portion of the year. A new value may be thus given to hedges, by rendering the moderate growers, and those easily kept in shape, efficient barriers for farms and fruit gardens.

Discussion.

J. W. Manning said he was convinced that the Osage orange will not make a practical hedge here, or north of Boston, though he had seen good ones in Connecticut. It soon becomes deformed by winter-killing. The Norway spruce is too heavy for a hedge in some positions. The American arbor vitæ is most practical; a hedge of it can be repaired, if injured, better than spruce. It is a great mistake to prune any evergreen hedge too close; instead of being closely sheared for years, it should be headed back less formally, and allowed to expand from bottom to top to remain healthy. If planted too close they are not so long-lived as when they have more room. Arbor vitæs should not be less than two feet apart and Norway spruces not less than three or four feet.

Benjamin P. Ware said that fifty years ago he assisted in setting a hedge of honey locust, which grew very vigorously and

was difficult to keep within proper limits. It was neglected, and some of the plants grew more vigorously than the others and now form a row of beautiful trees; many of which, however, are very near together, as they were planted only two feet apart. Some of the trees have no thorns. The land within forty feet of these trees is of little value; no corn of any account will grow there. A buckthorn hedge planted thirty years ago is now vigorous and beautiful but requires a great deal of pruning. The branches gain about an inch in length every year; if cut closer, the thorns will be removed. It is thoroughly hardy; no insect preys upon it, and cattle will not browse it. The berries are an excellent purgative, as is indicated by the scientific name, *Rhamnus catharticus*. Half a dozen berries make a good dose, acting promptly, and having no objectionable quality.

Edmund Hersey recommended the Red Cedar on the Atlantic coast. It is very hardy, will grow on any soil, bears trimming well, and with the aid of wires makes a good fence. It is seldom winter-killed, and is very desirable for a screen—better than many others. It thrives on the very bluffs of the ocean and is not injured by the spray.

Mr. Ware thought the red cedar difficult to transplant, and of slow growth. He had tried to grow it from the seed, and thought it would be desirable if this could be done.

Mr. Hersey said that he had never sown the seed, but the seedlings spring up in great numbers wherever there are old trees, and small trees are easily transplanted, and if taken up with a sod are very sure to live. He set a row on the south side of a board fence, where there was only gravel for them to grow in, and, though they were not watered, ninety-five per cent lived. They were not over a foot in height when set.

John B. Moore thought a hedge as a barrier a perfect nuisance, and moreover it is costly and harbors vermin. A wind-break is another matter. The Norway spruce or White Pine is best for this purpose, and should be allowed to grow as nature intended, but a strip of land two or three rods in width on each side must be sacrificed to it. If it is intended as a shelter for buildings it should not be placed too close to them, but several rods away, especially if of white pine. If landscape beauty is wanted, it is better not to have any fence, but to plant groves and groups of trees.

Leander Wetherell said that Mr. Moore had expressed his views; hedges are costly and incommodious as barriers here. They sucker

and breed and harbor vermin. For decoration and shelter they are going out of use. In Illinois, Osage orange hedges have been extensively planted, and Professor Turner told him that a wild steer could not go through one, but land is plenty and timber scarce there. The Osage orange has fruited in Connecticut, and a friend of the speaker had planted a hedge of it, but the soil here is not generally good enough, and he knew no good reason for its cultivation.

Benjamin G. Smith said that the *Pirus Japonica* makes a very beautiful hedge where one is desired for ornament. There are several in view from his residence. They are of slow growth, beautiful both in foliage and flower, and very desirable.

Joseph H. Woodford thought hedges desirable as screens in village gardens. The trouble with many buckthorn hedges is that they are cut square, with the sides perpendicular and the top horizontal, and under such treatment the lower branches are sure to die. He knew such an one which was headed down and, when it grew up anew, was trimmed in wedge shape, and is now most beautiful, with foliage to the ground. It is the same with Norway spruce hedges; the lower branches must be kept longest.

John G. Barker said that when Edward S. Rand, Jr. planted his grounds in Dedham, he desired to separate one part from another, and the question what to plant for a screen came up. It was finally decided to try the *Pirus Japonica*, and a hedge seventy-five feet long was planted, and proved all that was desired. The speaker had seen it in several places, and always beautiful. He has been for eleven years laboring to get the hedges away from around the small lots in Pine Grove Cemetery, at Lynn, of which he is superintendent. In planting a hedge or screen, the neighboring objects should always be carefully considered. He was consulted in regard to a hedge around St. Stephen's Memorial Church, in Lynn, a low walled building, around which it was proposed to plant a screen of Norway spruces, that would have hidden and dwarfed the building. At the Botanic Garden, in Cambridge, a screen was wanted to shut off the potting ground, and *Forsythia viridissima* was planted, which answered well, as long as it was cared for. He had seen at William C. Harding's, *Deutzia scabra* used as a screen, and *D. gracilis* planted along the top of a bank against a wall, forming a miniature hedge and giving an ornamental finish to the barrier.

Mr. Manning said that the California Privet, *Ligustrum myrtifolium* is being extensively planted for hedges along the shore at Newport, R. I. The foliage is larger than that of the English or American Privet, and remains green until zero weather. It is easily propagated by cuttings, which should be taken up in autumn and sheltered over winter, after which it is quite hardy. He has cultivated it for a dozen years; if unpruned it will grow twenty feet high. All hedges should be pruned in wedge shape. The white pine makes one of the best screens, and the Balsam Fir is good. He had heard no complaint of the Norway spruce for this purpose, except that it grows too large. When a strong windbreak is required, he would plant a variety of evergreens, and a double row is better than a single one. They should be ten feet apart where the land can be spared. The hemlock is the finest of all evergreens, but does not succeed equally well in all localities. He had a hedge of it injured by the winter, but renewed it. Arbor vitæ hedges running east and west are more likely to be injured than those running north and south, as is proved in his grounds. In 1863 he planted a hedge of arbor vitæs, seven or eight feet high, and lost only three out of several hundred. It is now twelve feet high, and spreads five feet. If he had pruned it close it would have been killed out in some places before now. *Spiræa Thunbergii* bears pruning well and makes a neat hedge.

William D. Philbrick said that the red cedar can be propagated by cuttings, on the cutting-bench in the greenhouse. Evergreens are injured by drought; the arbor vitæ has suffered much, and hemlocks somewhat, but Norway spruces less.

President Hayes said that he had planted an arbor vitæ screen, which had done very well. He had also a hemlock hedge which he thought very beautiful, and was astonished to see it, as he supposed, almost all winter-killed, so that he believed he should have to cut it down, but is now agreeably disappointed in finding three-quarters of it alive. He thought the *Pirus Japonica* very desirable for hedges. As a farmer, he would not have hedges; as a horticulturist, he would plant them for ornament and shelter.

Mr. Manning said that the *Cratægus pyracantha* (evergreen thorn), makes a magnificent hedge, with showy orange berries, but was winter-killed last winter. He thought that there had been a great change in public opinion, in regard to hedges, and that much fewer are planted now than formerly, but more evergreen trees are

planted for wind-breaks. Almost any evergreen tree, however large, will live, if you can get a ball of earth with it, or if it has been provided with a mass of fibres by frequent transplanting; but no rule applies in all cases. Evergreens must not dry between digging and planting. Of seven hundred prostrate junipers which he planted without balls, nearly all lived, but care was taken not to expose them to sun and air.

Notice was given that on the next Saturday, William D. Philbrick would read a Prize Essay, on "The Best Method of Constructing and Heating a Greenhouse for Amateur Use."

BUSINESS MEETING.

SATURDAY, December 15, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

William H. Spooner, Chairman of the Committee appointed October 6, to consider what further regulations were necessary for the better conduct of the exhibitions, and the preparation for, and closing of the same, presented the following report:

1. During the preparations for all prize exhibitions, a door-keeper shall be stationed at the door of the Hall, who shall on no account leave his position, and shall see that no person, except Members of Committees, and Exhibitors or their assistants, is admitted to the Hall, upon any pretext whatever.

2. At the close of every exhibition, a door-keeper shall be stationed at the door of the Hall, who shall on no account leave his position, and shall, on no pretext whatever, admit any person to the Hall except Members of Committees, and Exhibitors or those bearing written orders from them for the delivery of articles exhibited, and all other persons who may be in the Hall at the close of the exhibition shall leave immediately.

3. In the case of exhibitions continuing through the evening, no articles shall be removed until the next day, at such time as the Committee of Arrangements shall appoint; and the members of that Committee shall be present at such time, and shall attend to the delivery of articles exhibited.

4. The Superintendent of the Building shall employ all assistance necessary to strictly enforce the above rules, including police.

5. Exhibitors disposing of any of their exhibits *must* notify the Superintendent of such disposal, and the Superintendent shall not deliver such articles without a written order from the *owner* thereof.

The strictest rules, enforced in the most faithful manner, will, without the coöperation of the members of the Society, fail of full effect, and an earnest appeal is made to every member to set the example of strict compliance with the rules, even at the expense of slight temporary inconvenience, for the sake of the ultimate benefit to the exhibitions and the Society. Past experience of growing abuses has shown that such rules are absolutely necessary. If any exception is made in favor of any member, the next comer will claim an exception in his case, and the enforcement of the rules is at an end.

WILLIAM H. SPOONER,
Chairman of Committee.

The report was unanimously accepted, and the rules were adopted, and ordered to be printed.

Adjourned to Saturday, December 22.

MEETING FOR DISCUSSION.

The Best Method of Constructing and Heating a Greenhouse, for Amateur Use, Taking Economy and Efficiency into Account.

By William D. Philbrick, Newton Centre.

The average amateur, for whom we are to construct a greenhouse, will wish to keep a considerable variety of flowering plants, and also some stock of bedding plants, to be used in the garden in summer; he will take delight in propagating his own stock, and will therefore need a cutting-bench; some of the plants he will want are tropical, others are more or less hardy; some delight in abundant sunshine, others flourish better in partial shade or in the diffused light of a house facing northward.

To satisfy these various demands of the different plants to be raised, a span-roof offers at once the most efficient and attractive

plan; its south side will suit the flowering plants that love the sunlight, while its northern side will be the place for the delicate ferns, the camellias, and the cutting-bench. There will be no unsightly north wall as in the "lean-to" house, and by bending the rafters or sash bars, we can give it quite an ornamental appearance.

It should be partitioned off into at least three or four compartments. Two of these will face the sun and will be used, the one for hardy, the other for tropical plants, which love the sun and air, such as most flowering plants and bedding stock. The tropical plants will need a temperature of 60° at night, while the hardy ones will do far better in a temperature of 40° or 45° at night. They will both need abundant airing on sunny days and must therefore be provided with ample ventilators. The portion of the house facing north should be divided from the portion facing south, by a partition, for the plants which flourish in the diffused light also need little ventilation, and would suffer if exposed to the dry heat of the south side at mid-day.

We shall have then a span-roofed house, say twenty feet wide, and as long as the needs and the means of the owner require. The south side should have upright sashes for ventilation, three feet high from the ground; from the plate to which these sashes are hung spring the sash bars, of pine, two by one and three-eighths inches, rising to a ridge nine feet high, eleven and a half feet horizontally from the front of the house, and giving a length to the rafters of about thirteen and a half feet. The north side of the house will be eight feet wide, with rafters ten feet long springing from a sill laid upon a concrete wall three feet high. This plan gives a steeper pitch to the north side, so as to prevent snow from lodging, and will probably be found wide enough for the wants of most amateurs. The glass should be double thick, ten by twelve inches, bedded in putty and well painted over the putty. Ventilating sashes, three feet square, will be needed every six feet along the ridge-pole on both sides. A row of posts at each side of the path, running lengthwise of the house, and carrying a purline, will give sufficient support.

The compartment nearest the fire on the south side will be used for tropical plants, and the one directly behind it on the north side for the cutting-bench; beyond these and separated from them by a cross partition will be, on the south side, the place for hardy flow-

ering plants, and on the north side the place for ferns, camellias, smilax, etc.

The cutting-bench is best made of slate stone, supported on brickwork and heated by hot water pipes directly under it, and provided with valves for regulating the heat. The glass over the cutting-bench should be provided with curtains of white sheeting, to shade the delicate cuttings from the sunlight.

The heating apparatus best suited to the wants of the amateur, is the ordinary hot water circulation from a boiler placed about four feet below the level of the house floor, in a well-drained cellar, at one end of the glass, and covered by a shed or office, which, being always warm, will be found a convenient workshop in cold weather. In providing a boiler, always get one a size larger than the pipe-fitters advise, for it is a very bad thing to find your heating apparatus insufficient. Very much, however, depends upon having a good draft to the chimney; the same boiler will do twice the work with a good draft that can be done with a low and small chimney.

To maintain a tropical heat in the compartment which we have supposed to be eleven and a half feet wide, and nine feet high, will require six or eight four-inch pipes, while the portion devoted to hardy plants will not need more than half as many. In heating a house, very much will depend upon its location and the shelter afforded by the surrounding hills and trees on the north and west.

The compartments on the north side will require about four pipes to heat them enough; in the portion devoted to the cutting-bench two of these will pass under the bench and will be enclosed in brickwork, so as to give bottom heat to the cuttings.

Almost as important as the heating apparatus, is an abundant supply of water. If it cannot be had from the public works, a good dependence is a windmill, with an elevated tank fifteen or twenty feet high in the loft of the boiler house. It is desirable to have the water slightly warmed for tropical plants, and this may be easily effected by having the tank connected with the hot water boiler by circulating pipes provided with valves. The only objection to this arrrangement is that it places the whole circulation under pressure of the tank while heating, which is no objection if the joints are good.

This plan may be modified, if found convenient, by placing the boiler with its shed in the middle of the structure, carrying the

heating pipes both ways therefrom. This arrangement has the advantage that the circulation pipes will not extend so far from the boiler; this, however, is not a matter of great importance, and the location of the boiler will be governed in great measure by considerations of convenience as regards accessibility by the coal wagon, drainage of the cellar in which it is placed, and nearness to the supply of water. In the illustrations, the boiler is represented as being at the end of the structure; if in the middle, it would have a rather more symmetrical appearance.

If the water-tank is placed directly over the boiler, as represented in the illustrations, the waste heat from the boiler and chimney will effectually protect it from freezing, without any heating pipes for warming the water. This arrangement will suffice for watering hardy plants, but when watering very tender tropical plants the water needs warming.

The internal arrangements of the house will of course be best left to the taste of the owner and his wife; it will only be needful here to suggest that any plant will thrive far better planted in a bed where its roots can spread, than confined in a pot, but the confined condition of the roots favors early flowering. Moreover, plants that are to be removed to the open air in summer, are best potted. The pot, therefore, is a necessity, and it is best kept from drying up by plunging it to its rim in clean sand.

Such a house as we have described will cost from fifteen to twenty-five dollars per foot of length, according to the style and thoroughness of the work.

Many amateurs will not care for so expensive an arrangement, but will be content to have a small greenery of one apartment, attached to the dwelling house, and heated by a coil of pipe from the furnace in the cellar, or, where steam is used, by a steam pipe. There is a great deal of enjoyment to be had cheaply in this way, but it will hardly be necessary to give details, which must vary with the conditions of every case. The greenery must, however, be partitioned from the house so tightly that it can be smoked, without at the same time smoking the dwelling. A very convenient greenery may be cheaply made by fitting movable sashes between the posts of a piazza, to be moved in summer with all the furniture of shelves and pots. It may be heated by the furnace in the cellar; for this purpose it will suffice to place a heating coil of one-inch pipe, or a water-back, in the fire-pot of the com-

mon furnace, connected with a system of circulation around the piazza floor; or if steam is used for heating the house it will be very convenient to extend it to the greenery.

For small greenhouses detached from the dwelling house, the hot water circulation will be found cheaper and more satisfactory than steam, and far better than the old fashioned flue, red-hot at one end and cold at the other. Steam has its advantages where several houses are to be heated from one fire, since it is easier to divide and regulate the heat than with hot water circulation; but for heating so simple a structure as we have described above, there is probably nothing so efficient and economical as a good hot water boiler. The combination of flue and boiler is not of much practical importance, the amount of saving in fuel being balanced by the annoyance of impaired draft, and the danger from poisonous gases escaping into the house to the destruction of its contents. The flue is also a cumbrous affair and is now little used.

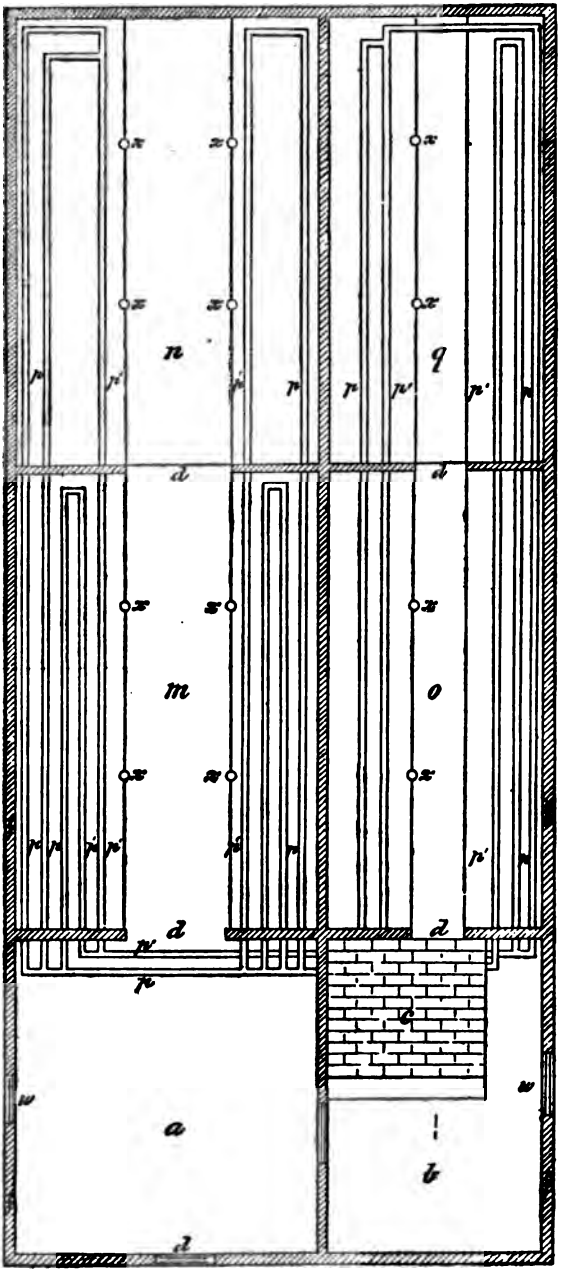
REFERENCES TO ILLUSTRATIONS.

Scale ⅛ inch to 1 foot.

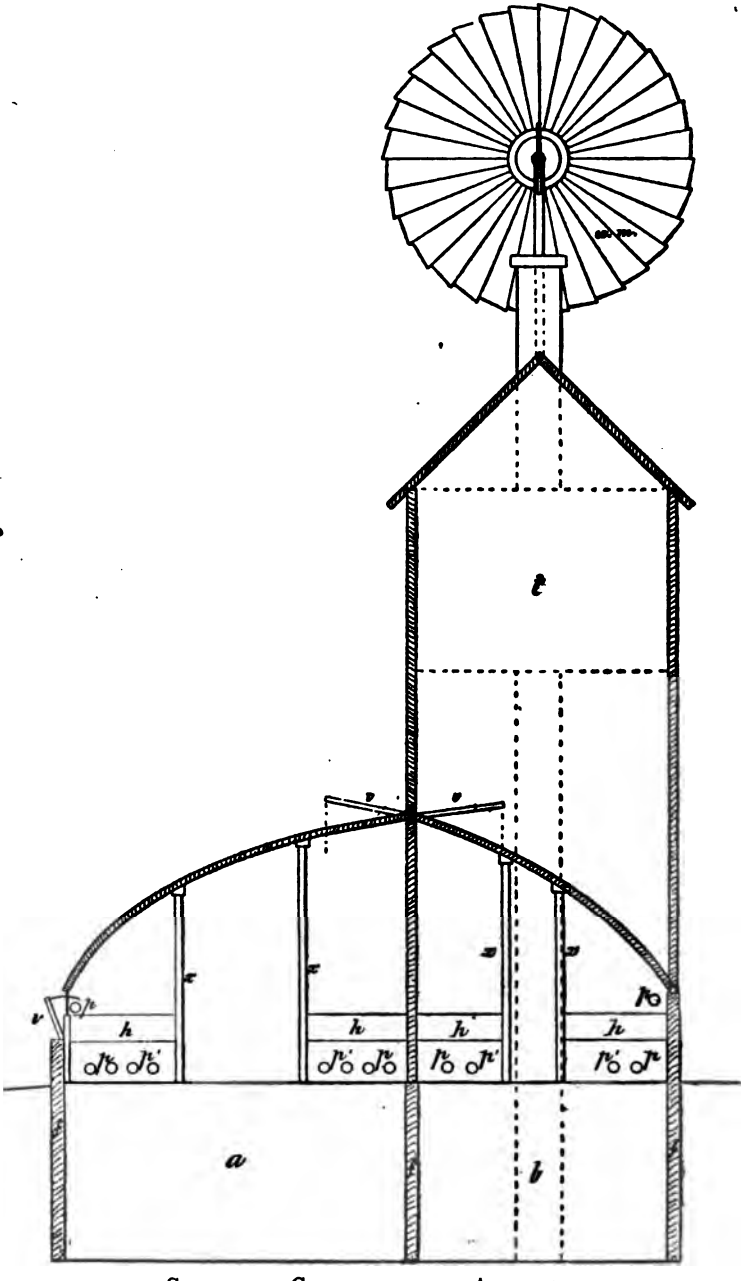
m. Apartment for Tropical Plants.
n. " " Hardy "
o. Cutting Bench.
q. Camellias and Ferns.
a. Coal Cellar.
b. Boiler Cellar.
c. Boiler.
d. Doors.
f. Foundation Walls.
h. Benches for Plants.
h'. Cutting Bench.
p. Flow Pipes.
p'. Return Pipes.
t. Tank.
v. Ventilator Sashes.
w. Windows.
x. Posts.
w. m. Windmill.

Discussion.

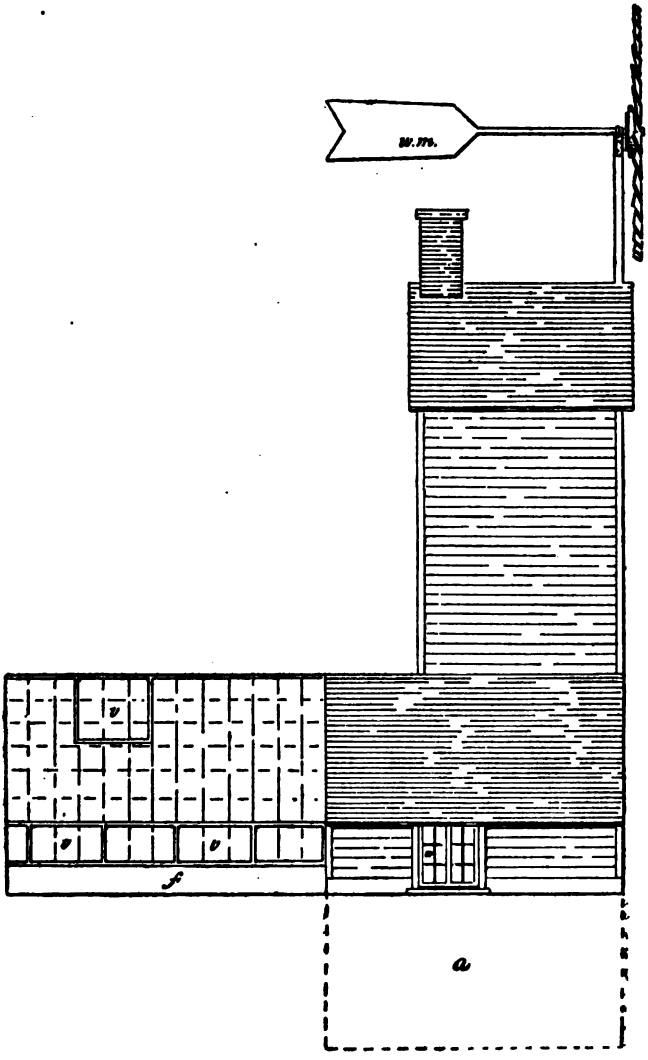
John G. Barker gave an account of the greenhouses at Pine Grove Cemetery, Lynn, of which he is superintendent. They are different from those considered by the essayist, as it was necessary to adapt them to the location. A plan was proposed by an architect, for which the means at command were insufficient, and the



PLAN OF GREENHOUSE FOR AMATEUR.



SECTION OF GREENHOUSE FOR AMATEUR.



FRONT VIEW OF PART OF GREENHOUSE FOR AMATEUR.

houses proposed were too large and not adapted to the situation. The place selected was a hill-side which it was desired to utilize. It was decided that a lean-to house was most eligible, and the front and back walls were constructed of split stone, found on the place. The house is fifty feet long, by fourteen feet wide, and eight and a half feet high. It has a fixed roof with a pitch of forty degrees, and is glazed with second quality double thick German glass, twelve inches by sixteen. The ventilators are two and a half feet square, and two feet apart. There is a bench on the front side, three and a half feet wide, under which cannas, abutilons, etc., are stored. The walk is two and a half feet wide. The house is used mainly for propagating coleuses and other bedding plants for summer decoration, and also plants for filling a large number of vases. Attached to it is a work-room, ten feet long, with a sky-light in the roof. The house is heated by a brick flue, the face of the furnace being in the potting-shed, so as to keep smoke and coal gas out of the house, and the coal bin is opposite the furnace. The appropriation for building it was $1,000, and though it was thoroughly built, $28 was left when it was completed.

Another house was wanted, and it was placed directly in front of the first, and was built a little larger, with only sufficient slope of roof to throw off the water, being fifty-seven feet long, fourteen and a half feet wide, and eight feet high. It is used for pelargoniums, aloes, palms, etc., and the palms never suffer from dampness. The roof is all sashes, three feet by six, the lower row being fixed and the others movable. This gives excellent ventilation when the weather becomes warm in spring. A cement walk runs the length of the house, with a bench in front. Four feet from the back wall, a brick wall was built, and filled in with soil, in which aloes and other plants are set, which saves the trouble of potting. The remainder of the house has a gravel floor, on which plants in large tubs are set. This house, also, is warmed with a hot-air flue, and the same coal-bin serves for both houses. Mr. Barker believes in keeping in all the heat, and has seldom had occasion to make up more fire after dark. He burnt ten tons of coal in both houses last winter. Both houses work exceedingly well, but in large houses a flue would not answer. The houses will take in pretty tall plants, and he has tried to utilize all the room. The appropriation for the second house was $600, and was not exceeded. The estimate of an architect for houses to

afford equal accommodation with these was $5,500. The speaker thought that mistakes were often made in building houses too high.

President Hayes gave an account of his experience in building plant houses; the first being a conservatory attached to the rear of his city residence, which was planned by an architect, who estimated the cost at a thousand, or possibly twelve hundred, dollars. It was soon found that it would cost more, and the next estimate was $1,800, and next it was thought that with some improvements it might be built for $2,500. Then the war broke out, and the architect was elected an officer and went to the war, and when the conservatory was finished, the bills amounted to $6,000. With this experience, when he wanted a conservatory at his summer residence in Lexington, he determined to employ men who understood their business, and accordingly Messrs. Lord & Brigham, of Irvington-on-Hudson, N.Y., who make a business of constructing plant houses, furnished plans and estimates for a house about eighty by forty-five feet, and quite high, and the expense did not exceed the estimates. He wanted rather a cool house for azaleas, palms, etc., including a collection of camellias which he had procured from Ex-President Wilder and others, and it has worked very well, and he could recommend the builders. The conservatory has a grapery and rose house attached, which are heated by a small boiler.

William C. Strong thought the President's recommendation of greenhouse architects a wise one, but it would be still better for practical cultivators to study the subject and go by their own common sense. He agreed with the essayist that there are positions where flues will answer, but generally hot water is best. Possibly, for large establishments, steam may be more controllable, and more economical, though the last point is doubtful. Steam requires more attention; it must have a man to watch it night and day. The speaker could perceive no difference in the atmosphere between hot water and steam. Perhaps steam will give more heat in very cold weather, but plants may not grow as well in the immediate vicinity of the pipes. Cast-iron boilers are extravagantly high priced, and do not economize heat as well as wrought iron tubular boilers. Second-hand tubular steam boilers, of sufficient strength for hot water, can often be purchased at very moderate prices. He has one for which, with all the appliances, he paid $100, and which will do the work of four of the largest sized cast iron boilers, costing $250 each, and will stand for a dozen years with hot water.

He had been much interested in the experiments in the use of vaporized petroleum for burning under common boilers. The inventor said that a boiler sufficient to heat ten acres was entirely practicable. It gives intense heat, and is used at the Norway Iron Works, in South Boston, for melting iron. He had no doubt of the advantage of hill-side greenhouses; the heat of the sun is a material factor in carrying one through the night.

Hon. Marshall P. Wilder preferred the atmosphere of hot water to that of steam. He has a hot water apparatus with copper pipes, put in forty-five years ago. The boiler has to be renewed once in eight years.

Mr. Philbrick compared the cost of heating by flues as recommended by Mr. Barker with that of heating with hot water. Mr. Barker's two houses have an area of 1,526 square feet, and he burns ten tons of coal. In his own lettuce house, with more than three times that area, he burns about fifteen tons—never more than eighteen.

Mr. Barker asked whether Mr. Philbrick began heating his lettuce house as early as he did his plant houses.

Mr. Philbrick replied that he heated his house for about six months, or whenever needed from October to May.

Col. Henry W. Wilson said that he had studied the subject under discussion for twenty years, and had had a good deal of experience in building plant houses. People study for a tasteful structure, when the first thing they should consider is the location, and, second, what plants are to be grown, and construct the house accordingly. Roses and smilax will not succeed in the same house. In 1868 the speaker built a small hot-bed, and the next year put on a monitor roof, and in 1870 he built a pit and heated it with hot water. The next year he put on an **L**, and raised ferns and smilax, cutting from two to three hundred yards of smilax at once. This went for two years, when he extended eighty feet in one direction and fifty in another, giving the plan the shape of a Gothic **F**. He had six or seven hundred pots of pinks, some dozens each of callas, camellias, azaleas, etc., giving him all the flowers he wanted for himself and his friends, and the sales paid all expenses. There is generally difficulty in getting uniform distribution of the heat; but he had his furnace in the centre of the house, and sunk so as to give a good circulation, and the thermometers at opposite ends never varied. By suitable arrangements of the pipes and

valves, the amount of heating surface could be increased or diminished at the instant, and thus the temperature of the house could be raised more speedily than by depending solely upon the firing, and could be lowered more safely at times than by the admission of outside air. There were, in effect, three distinct methods of circulation of the water.

He had 2,500 square feet of glass, and never used above ten tons of coal in a winter. Heat is applied to greenhouses to make good the loss by radiation; and as much of this loss as can be should be prevented. Nearly all greenhouses are built above ground, but he put the walls of his below the ground, and used burnettized lumber for the sake of durability, and also because it is free from the mosses and fungi which grow on wood when not thus prepared. The walls above ground consisted of posts boarded and covered with tarred paper and clapboards. He would not use second quality glass, because it has lens-like imperfections, which are liable to burn the plants, and the first quality costs but little more. He used glass ten inches by forty, which gives fewer joints, and is cleaner and therefore better, and, if double thick, will stand most hailstorms. Hard pine is better for rafters than burnettized spruce, because, though the latter is more durable, it does not in burnettizing lose its propensity to twist. He put in mechanical ventilators, and knew they were secure; they are the best arrangement where they can be afforded. The house was demolished by a tornado in 1879, and was not rebuilt.

He had in his house eight or nine grape vines, which gave him two hundred pounds of fruit annually. The whole was taken care of by one man, and he could recommend the same general plan to others. He was troubled about propagating plants, but carried a branch from a hot water pipe under the propagating bench, with a valve to regulate the heat, and then had perfect conditions for propagating—bottom heat, and cool air on top. Houses for propagating should be made very low, and are better if sunk in the ground, with the young plants near the top.

The best means of imparting heat is that which affords the desired temperature from the lowest temperature of the heating surface. Hot water pipes may be at a temperature of 180°, while steam pipes cannot be less than 212°, and with a pressure of three or four pounds to the square inch, will be 220°. Another great advantage of hot water pipes is their conservative quality, pre-

venting sudden fluctuations of heat, there being nine hundred gallons of water in the same number of feet of four-inch pipes, while there would be only two quarts of water in the steam which would fill the same pipes and afford the same heat. There are two reasons which have hitherto led to the choice of hot water in preference to steam as a means of heating plant houses,—first, that the extreme dry heat of steam pipes is a source of discomfort to animal life, and must be equally unfavorable to the tissues of tender plants; second, the latent heat of the water gives it a sort of conservative quality, whereby frequent or violent fluctuations of temperature are avoided when it is not possible to give constant attention through the night.

Mr. Wilder said that he used second quality glass, and picked out the best, but could not avoid some imperfections, which are liable to burn the foliage of plants. Instead of whitewash to prevent burning he uses mutton tallow, melted and applied with a sponge, as thinly as possible, on a warm day. It does not discolor the glass to any extent.

Joseph H. Woodford said that a year ago he visited several establishments with a view of finding the best boiler for running an engine. He visited the Norway Iron Works, where petroleum vapor has been substituted for coal. He believed that this fuel will find its way to greenhouses as soon as boilers small enough can be supplied. At present the demand for large boilers is so great as to give the makers enough to do without making small ones. A barrel of oil, costing three or four dollars, would last a great while for heating a greenhouse. He had lately visited Edmund Wood & Co.'s greenhouses at Natick, where he saw ten thousand Maréchal Niel roses ready to cut, and large quantities of Baroness Rothschilds and Gen. Jacqueminots, besides other flowers and ferns in great variety. The whole establishment is heated by steam from a sixty horse-power Babcock & Wilcox boiler, with the best results he ever saw. The fuel used is peat, just as dug from the bog and mixed with one-third anthracite coal dust, which heated to perfection. The makers of these boilers have in a year and a half put in three million dollars' worth of them. They burn everything—cotton refuse, etc., with the natural draft. The first cost may be a little more than that of other boilers, but it would soon be saved by those who have a deposit of peat, of which there are great quantities near Boston.

Notice was given that the subject for discussion on the next Saturday, would be "Carnations, Pansies, and Violets."

BUSINESS MEETING.

SATURDAY, December 22, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Annual Report of the Committee of Arrangements was read by the Secretary, accepted, and referred to the Committee on Publication.

The President, as Chairman of the Executive Committee, to whom a communication from the Worcester County Horticultural Society, in regard to the exemption of horticultural societies from taxation was referred, reported that the Committee were unanimously in favor of coöperating in the effort to secure such exemption, and had appointed a Sub-Committee to confer with the Worcester Society on the subject.

The President also reported that the Executive Committee had unanimously re-appointed George W. Fowle, Treasurer of the Society and Superintendent of the Building, and Robert Manning, Secretary and Librarian, for the year 1884.

Adjourned to Saturday, December 29.

MEETING FOR DISCUSSION.

CARNATIONS AND PANSIES.

C. M. Atkinson, who had been appointed to open the discussion, spoke first of the pansy, and described the properties of a perfect flower. Form is the most essential point, and includes not only shape but smoothness of margin and perfect flatness of petals, which must be so disposed as to form a perfect circle. Indeed, when the lower and two upper petals are removed, the two side petals will in first-class flowers meet at the upper and lower parts; for the petals to meet well above the eye, thus making the form of

the shield complete, is of the utmost importance. A disposition to bloom flat is also desirable, and the contrast between a rough, uneven, frilled flower, and one which, without artificial means, will dispose of its petals evenly and smoothly, exhibiting its rotundity in all its perfection, will immediately fix the attention and catch the eye of the veriest tyro. Saw toothing is another defect, and sometimes occurs in flowers otherwise unexceptionable, and even though minute, it tells against them. Indentation of the lower lip often occurs in otherwise good flowers, and destroys their rotundity, which is absolutely essential.

The second point is substance of petal. Whatever may be the excellence of form, if the flower be flimsy and weak, its beauty is destroyed. The petals should be thick and velvety, thereby enabling the flower to stand well. On the third point, harmony or a proper distribution of color, there has always been much diversity of opinion, but the best judges hold it absolutely essential that the three bottom petals agree in shade, whatever be the color of the upper ones; and in selfs it is necessary that they should all assimilate. No flower with the ground color stained can be admitted as first-class; it is as great a defect in a pansy as a discolored bottom to the cup of a tulip. Whether it be a white, yellow, or any other colored self, it must be pure and steadfast, and the eye large and well defined; and the more the latter contrasts with the body color the better. If the color be black, crimson, maroon, or purple, the eye must be white or yellow, with no shading off. In belted flowers, or those with a margin of color encircling the three bottom petals, it ought to be of a uniform width throughout, and in a perfect flower of this class no triangular spot is seen. Size is the least of all the essential requisites to a good flower; in either a single flower or a collection, judges give to form, four points; substance, three; distribution or harmony two, and size, one.

The pansy has undergone some changes within the last twenty-five years; the class of fancy pansies, of which fine specimens have been shown here by E. L. Beard, has been introduced within that time. But the culture remains the same, the requisites being young plants, rich mould, and a regular degree of moisture. Those about to commence should procure a three light frame, a few dozen well selected plants, a cartload of good loam, and some rotten leaf-mould, sand, and thoroughly rotted cow manure.

Horse manure should be avoided. The bed should be prepared as early as the ground and weather permit. It should not be exposed to the full glare of the sun; and if the soil is naturally poor, wet, sodden, heavy, or sandy, these evils must be counteracted by striking the medium. The plants should be set a foot apart and six inches from the edge of the bed, and should have a good watering after being planted, and the surface of the bed must be often stirred. In dry weather it must be watered with a fine hose every evening, not merely wetting the surface, but thoroughly. The beauty of the first bed will be over by July; if necessary to replant, young plants should be prepared in the interval from cuttings; or by dividing the old plants and adding manure a good bloom may be obtained in autumn. But a good substitute may be found in a few choicely selected verbenas, or other bedding plants, thus giving the amateur ample time to prepare a fine batch of plants for the coming year. Though the pansy suffers very little from frost, it should be well protected in very severe weather. To keep up a good variety, select the best seed and mark each color separately. Mr. Atkinson said that he had, at the time of speaking, plants in a three-light frame, which he should transplant in the spring into a border, shielded from the noonday sun by trees, where they have always done remarkably well.

CARNATIONS. The present perfection of this delightful "florist's flower" is the result of long and patient industry. At the beginning of the eighteenth century it numbered between five and six hundred varieties. Throughout the civilized world it is an especial favorite; its simple and graceful beauty, and, above all, its delicious fragrance, have an irresistible charm over all hearts. In its normal state it can be found among the Swiss Alps, and occasionally in the southern parts of England, upon the broad ridges of castle walls and ancient buildings.

The parent of the present carnation of the florist is botanically designated *Dianthus Caryophyllus*, and from this has sprung sufficient to supply the most capacious taste. It has a sportive power of self-variegation and activity, to keep even a morbid love of novelty in constant play; but such are the requirements of the present standard that scarcely one in a thousand possesses sufficient interest to command more than momentary attention. As excellence in variety has increased, fastidiousness has kept step to reject from the very name of carnation all such flowers as have the

prevailing red color of the clove-pink, and all others, be what they may, which have not a ground of pure, unspotted, untinged white. All carnations, understood within these restrictions, are classified as Bizarres, Flakes, and Picotees, and are again distributed into two other sub-divisions. Bizarres are striped with two colors on the white ground, and have their colors in irregular variegations; Flakes are striped with one color on the white ground, and have their stripes large and extending across the petal. Picotees are pounced and spotted in a very diversified manner on their white ground, and are more hardy and generally smaller than the other classes. The bizarres generally show a greater proportion of one of the striping colors, yet those are held in the highest estimation which exhibit the two colors in equal proportion, with the stripes running parallel to each other and distributed equally over the flower. The same may be said of flakes, which too often exhibit too much or too little of the striping color. Those are the best which exhibit the striping and ground colors in well balanced proportions. Formerly the distinguishing character of the picotee was the notched or fringed edge, but such will not now pass muster, where judges and growers are even indifferently posted up. They must possess the smooth edge, or what is technically termed *rose leaf*, and their colors must be bright, clean, and well defined. Scarlet bizarres are striped on their white ground with scarlet and maroon, and the varieties of these are such as differ in the intensity of their colors. Crimson bizarres are striped upon their white ground with either pink and purple, or rose and purple. Flakes are distributed into three sub-divisions, viz., scarlet stripes, rose and pink stripes, and various hues of purple; but in each sub-division there is a great diversity in the shading of its characteristic color.

Picotees, which are very numerous and diversified in variety, are distributed into four sub-divisions, with respectively scarlet, crimson, rose, and purple colors, and are severally distributed into two groups, the one heavy-edged, or having the color thickly laid on round the margin of the petals, and the other feathered or light-edged, with the color touching the petals in an unbroken and very delicate line.

Much diversity exists as to the best method of cultivating carnations; it is a topic that has been very copiously discussed, but can be very easily and satisfactorily disposed of in a few words. In

Europe they, i. e. "show varieties," are universally cultivated in pots; but that method is totally unsuited for practice here. Good, deep, garden soil (yellow loam is preferable), enriched with thoroughly rotten cow manure, some leaf soil, and, if too adhesive, some sand, are requisite. Dig deep and thoroughly, and when the weather is fairly settled, set out the plants nine inches by twelve apart, and stir the surface frequently. When the buds become fully swollen, and before they burst, a ligature should be tied around each pod, half-way down; when the bursting commences, take hold of each division of the calyx, and turn it down to the ligature. The weather about the time of flowering is usually bright and hot, thus prematurely hastening the development of the flowers. An evening visit with the water-pot, sprinkling in and around the plants, but not over the flowers, is beneficial. Shade, too, in the hottest part of the day is necessary. For the real amateur, cotton cloth, attached to a roller and fixed on a neat skeleton framework, so as to let up and down at pleasure, is the thing. Second-hand fishing nets or seines, stretched double over stakes sufficiently high to allow of walking under them, are a very good contrivance, and need not be moved until the bloom is over. In Europe they display six or eight flowers, supported by a stake, but the speaker said he liked a good mass rather than a few.

As soon as the "grass" is ready for layering, this should be done, thus obtaining strong plants by the middle or end of September, when they should be transferred to their winter quarters. These should be prepared by making a bed the size of your cold frame and planting it thickly; by the end of November, strew two or three inches of dry tan, or, which is preferable, pine needles, among them; put on the frame, add a few more pine needles, place the sashes over them, but give all possible air; exclude nothing but heavy rains, snow, and extreme frost. When bright, lovely, smiling May comes round again, transfer them to more agreeable and attractive quarters, and there induce them to become, as they truly are, "Jove's own flowers."

E. W. Wood was called on by the President, and said that the carnation is grown extensively under glass, and usually in a house by itself. Those who make a business of growing it, can afford to give it a separate house, as it does not do well with other plants, wanting a cooler temperature. The cuttings are put in in January,

and after striking are potted in three-inch pots, and put in frames, where they grow slowly; early in May they are planted out. The speaker had set plants the first day of May, and on the third sufficient snow fell to cover them without doing any injury. The bloom depends on the strength of the plants. He sets them fourteen inches apart each way and nips them back during the summer; this is necessary to make them bushy. About the 10th or 15th of September, they are taken up and transferred to the greenhouse. Some cultivators put them in six or eight-inch pots, and he formerly did so, but now he put them directly into the beds, which succeeds better and saves labor. If the weather is warm, they must be shaded. They will come into bloom almost immediately. He had not succeeded in producing continuous bloom, but had seen it done. He has them in a house with a span-roof, where the sun does not strike for thirty days in winter, but in February they will bloom, and he will take them out about the 10th of June. He has cut as many blooms in this house on the 30th of May, as at any time.

The pansy is one of the most desirable and satisfactory flowers. It can be grown by everybody. He puts a hundred and sixty plants in a frame three feet by six, which is four times as many as he will leave there, and covers them with mats to keep out the frost. At the time of speaking they had been in bloom for some weeks, and had been uncovered but once. In spring he will take out three-quarters of them. The bed faces the south. He makes the soil as rich as he can.

William C. Strong said that for commercial purposes it is hardly necessary to pot small carnations singly; they may be taken from the cutting bed and set in "flats," and planted out about the first of May. He knew this method to be successful. The soil should be rich, but not with undecomposed horse manure, which when mixed with loam makes it too light; and is especially injurious in the house. A cool house, especially devoted to the carnation, is best.

Henry Ross said that he sows pansy seed in the house and pricks off into hot-beds, using the same soil as for lettuce. He puts in carnation cuttings in January or February, and plants out in May, in soil not richer than if for potatoes. They want a cooler house than bedding plants. In the house he formed a large bed for them on a plank bottom over the water-tank, with eight inches of soil, rich with manure, leaf-mould, and hot-bed material.

Col. Henry W. Wilson said that the pansy can be cultivated very satisfactorily by ladies and young people, who can derive a great amount of pleasure from the cultivation of plants that would not take high rank when measured by established standards of excellence. He would not care to save seed unless the varieties were very choice. The soil should be the average compost of well rotted turf, sand, and well decomposed manure. The chemical action of undecomposed manure is very injurious. If the seedlings are planted in a box, they will fill the soil with roots so that it can easily be cut up into sections with a knife, and taken up with the plants when they are transplanted. Irrigating pansies and carnations is better than watering them over the flowers. He had effected it by placing a cask of water at the head of a sloping bed, and arranging little channels so that the water would flow among the plants. He objected to an arbitrary standard of perfection for pansies, as tastes might differ; some might fancy black flowers, while others might like the bronze.

Edward L. Beard said that the carnation is never seen in such perfection as in the humid climate of England. The average carnation here is not a success. The speaker lately received from England twenty varieties, in cuttings rooted in two or three-inch pots, which are as robust as cabbages, and this vigor is due to the conditions of climate. They are fond of lime and he puts lime rubbish in his pots, and they forsake all other soils for that. Lime is deficient in our soils. It is an enemy to all worms, which are very destructive to carnations, especially a little white worm that attacks the roots; but lime is a preventive of its injuries. In potting some carnations, he left two without lime, which were both attacked by this white worm and died, while all the others were promising. Our summers are too hot as well as too dry for carnations, and when cuttings are left, either by amateurs or commercial florists, to take their chance, they fail in getting strong plants. The new kinds are not grown to compare with the old varieties. The speaker has raised some good seedlings; among others a true scarlet, and he thought this a good field for raising seedlings. The carnation must have peculiar conditions of soil and atmosphere, and the red spider and green fly must be kept from them; many collections suffer from these insects.

The pansy is easy to grow, but it is not so easy to get a good strain; our growers have not the patience to comply with the

necessary conditions. A package of seed will produce many varying kinds, but the florist's ideal is difficult to get. You may find in a package twenty-five good kinds, with perhaps one *rara avis*, and if you are willing to sacrifice the rest, and take up those saved, the last of April, and plant them on the north side of a fence, putting in a load of leaf-mould, and then go on with hybridizing, isolating the plants, you may get one pod of good seed from each plant. The pansy does not bestow its gifts at sight; like good people, good pansies are scarce. There is the same trouble with them as with carnations; they deteriorate in summer, and the speaker throws them away in midsummer. They will not form seed in a hot, dry atmosphere. He thought better strains could be procured from the continent of Europe, than from England. The wonderful English and Scotch varieties exist on this side of the Atlantic only in fiction, and the named varieties of this class are difficult to import. He has saved good seed and raised good varieties. The quantity was comparatively small, but some of the seed was of the best quality. Pansies must be brought into flower early in spring; those produced the last of May are poor in comparison with the early blooms. There is a mistake in manuring them too heavily in cold frames; he had planted some without a layer of manure underneath, which he sometimes gives them, and others with leaf-mould preponderating, and liquid manure as the plants came into flower, and they did better than those heavily manured. Heavy manuring breeds slugs, which are very injurious, especially in heavy clay soils, where they will cut the flowers all to pieces. The remedy is to strew soot among the plants. He would put his money into leaf-mould for pansies, rather than into manure. The only way to keep pansies from deteriorating in hot weather is to lift the plants from the frames, and set them on the shady side of a fence or wall. The pansy ought to be viewed by some standard, and there is no question that the large, regularly formed, and distinctly colored and marked flowers are more beautiful than the washy ones so common in commerce, where the colors are run together, without being distinctly outlined according to the florist's ideal.

Hon. Marshall P. Wilder confirmed what the preceding speakers had said, and added that he had grown the carnation only in pots, and that he could do nothing with them unless he kept them as cool and as near the light as possible. He wondered that with our

clear, bright sun, which perfects seed so admirably, more had not been done here in hybridizing, especially with the encouragement derived from our success with the camellia and azalea, in which we have equalled, if we have not surpassed, any other part of the world.

Mr. Atkinson said that the high standard pansies, whose existence Mr. Beard had doubted, do exist, but the seed canot be purchased. Charles Turner told the speaker that anybody was foolish to expect to get the best quality of seed; that was always reserved. Every grower must save the best every time and always. You must save your own seed if you want the best, for the growers do not produce it in sufficient quantity. As to the standard of a perfect pansy, no one is compelled to adopt it, but it is absolutely necessary to have a high standard. The carnation is often found by the side of old walls, showing the importance of lime to its growth. In his remarks on the carnation he spoke of it exclusively in pot culture, and not of tree carnations.

The subject for the next Saturday was announced as "The Culture of Hybrid Perpetual Roses, for Private Gardens, for Sale, and for Exhibition Purposes."

BUSINESS MEETING.

SATURDAY, December 29, 1883.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Hon. Marshall P. Wilder announced the decease of Dr. Louis Édouard Berckmans, of Rome, Georgia, a corresponding member of the Society, a pupil of Van Mons, and a co-worker with Esperen, Bivort, and other leading European pomologists, and himself eminent among them. He moved the appointment of a committee to prepare memorial resolutions, which motion was carried and the Chair appointed Mr. Wilder, Leander Wetherell, and John C. Hovey, as that Committee.

The meeting was then dissolved.

MEETING FOR DISCUSSION.

The Culture of Hybrid Perpetual Roses, for Private Gardens, for Sale, and for Exhibition Purposes.

E. W. Wood was called on, and said that he should speak first of roses in private gardens. Great improvements have been made in Hybrid Perpetual Roses in the last ten years, and especially in the continuity of their bloom, so that they are now much more desirable than formerly, and are better entitled to the name of Perpetuals. In laying out grounds, it was formerly an objection to beds of roses on a lawn, that they were not handsome after blooming, but, now, with careful selection of varieties, a bed may be made an ornament to the front lawn, or worthy of the most conspicuous place in the flower garden, from the time when they begin to bloom until frost, and will afford flowers for cutting every day; in short the Hybrid Perpetual Rose has become one of the most satisfactory flowering plants.

For market, Hybrid Perpetual Roses take precedence of all other flowers. Some florists have discarded all other flowers, and give their attention wholly to roses. We are favorably situated for growing Hybrid Perpetual roses under glass, especially the bright colored kinds, and in New York we may see in the florists' windows "Boston rosebuds" offered for sale. The New York florists have taken the most skilful rose growers from the houses here, but even then have not succeeded in equalling those grown here. More money is invested in the cultivation of roses for sale, than in that of any other flower, and the cultivation is increasing, both under glass and out-doors. It is one of the most profitable summer flowers. The showy newer varieties are valuable not only for their beauty, but for profit.

The increase in the exhibition of roses is shown by the very gratifying increase in the number of contributors to our shows. For cultivation under glass, it is a great help to bud roses on the strongest growing stocks, as they are much more vigorous and afford a profusion of bloom. This method is adopted by the best English exhibitors, and here Mr. Dawson, of the Arnold Arboretum, has been experimenting to ascertain the best stocks. It has been objected that stocks throw up suckers, which injure the grafts, and the speaker had seen such cases, and a friend related

an instance where, on pulling off the suckers from a lot of imported roses, which appeared to be growing very vigorously, half of them were found entirely, and others nearly dead; but there is little difficulty in distinguishing between the shoots from the stock, and those from the graft, and the former will do no injury if taken off seasonably.

President Hayes said he had seen roses displayed in the florists' windows in Ottawa and Montreal, Canada, labelled "Boston buds."

William H. Spooner said that the rose is a thing of beauty and therefore a joy. It is the leading flower of our gardens today. He prefers them, both for garden and exhibition purposes, grafted on the Manetti stock; for light soils such are certainly preferable. The bud or graft should be inserted not more than six inches from the roots, and when finally planted should be set two or three inches under ground, when it will send out roots the first year. The past season has been very unfavorable to roses, on account of the extreme drought. Boieldieu, Mlle. Marie Rady, Comtesse Serenye, and Elizabeth Vigneron, have proved almost entire failures. The buds were so tight that they would not open. Mme. Gabriel Luizet proved beautiful under the trying season. Alfred Colomb, Jean Liabaud, Victor Verdier, and J. Stuart Mill, have done well; Magna Charta did admirably, growing well and flowering freely, and proving hardy. La Rosière, a dark kind, very much like Prince Camille de Rohan, if not identical with it, has done better than ever before, as have also Abel Carrière, and Jean Soupert. The Duke of Wellington was fine. The Climbing Victor Verdier is one of the best garden roses. The Cheshunt Hybrid has Tea foliage, and suffered from the winter, but in an ordinary season would prove hardy. La France and Souvenir de Mons. Boll did well. The Climbing Bessie Johnson is a very strong grower and flowered freely. Mabel Morrison proved not to be a good bloomer in dry weather. Firebrand proved a strong grower, but a poor flowerer. Marie Baumann, an old kind, did well. Baron de Bonstetten is among the best. Charles Lawson, a Bourbon, gave a mass of bloom, but is not suited for exhibition. John Hopper is good. The Duke of Edinburgh is not up to the standard. Jules Margottin and the climbing variety of the same, both did well.

Some of the Hybrid Perpetual roses have very beautiful foliage. Dupuy Jamain is almost as good in this respect as Baroness Rothschild. Captain Christy is a Hybrid Tea, with beautiful foliage, but

a little tender. Mme. Charles Wood is a good flower, but the plant is a poor grower. Louis Van Houtte is the best rose of its color, but is not very hardy and has proved almost a total failure. Senateur Vaïsse is an admirable garden rose, and so is the Marquise de Castellane, in most seasons. Dr. Andry is perfectly hardy, but Mme. Eugénie Verdier is a little tender. Fisher Holmes is an improvement on Gen. Jacqueminot. With the multitude of varieties, the Hybrid Perpetuals are the class for general cultivation. Some of the newer shades are very desirable. Moss roses did not generally do well the past season. Of the three perpetual varieties, Salet, Mrs. W. Paul, and James Veitch, all flowered well; the last is a dark kind but not a very good grower. The Common Moss did not do well. Laneii, which is the next best, did well. The Crested Moss, which is never very healthy, will flower freely if it can be made to grow vigorously.

In answer to an inquiry whether as good varieties of roses could not be produced here as in Europe, Mr. Spooner said that they could, but the European growers have the advantage of larger stocks, to hybridize and produce seed from.

Joseph H. Woodford said that roses will stand any quantity of manure. He knew a grower who dug trenches between his roses and buried the contents of his cesspool in them to their great advantage. The reflection of the sun from the snow, when the sap is just starting, will burn the bushes; a little litter thrown over them will prevent this. It is true that budded roses are apt to throw up suckers, but any one at all familiar with them, can distinguish the suckers from the grafts. The best way is to put the whole stock under ground, and get them on their own roots. He would not grow roses long in one place, but would renew them once in four years, if wanted for exhibition. They are much better from young, vigorous plants than from old, gnarled roots. He has some fifteen years old, which he cuts in closely, and gets good blooms from them, but not as good as from younger plants.

Mr. Spooner said that he has plants of the Duke of Edinburgh, which have been standing ten years on the same spot, and give as good blooms as ever.

Edward L. Beard said that there is no question that roses deteriorate by standing long in one place. In England, rose growers exhibit flowers chiefly from one year old plants, known as maidens. Most of them change the soil every year; roses will exhaust it in

two or three years, and by constant manuring it becomes too light and friable for the needs of the rose. The second year the plants are cut back. They must be shifted from year to year, for no feeding will take the place of shifting; manure will not supply the want of fresh loam. Where a rose has done well one season it will not always do so the next. The difference is caused by the difference in the ripening of the wood; in autumn the wood of some is hard and well ripened, while that of others is soft and green when the fall frosts come. The Baroness Rothschild is irregular in blooming, and in this climate is a failure out-doors; a good bloom is the exception. The transition of roses from rest to bloom is too sudden here, and they do not do as well as in England, where it is more gradual. The darker roses rarely reach perfection out-doors here, and many of the newer shades are of doubtful permanent success. Gloire de Bourg la Reine, for instance, fades so rapidly as to be worthless, and we shall have to adhere to the standard kinds. His great theory is that change of soil is essential to success, and rose growers are fortunate if they have the opportunity to act upon it.

William C. Strong agreed with Mr. Beard as to the necessity of change in soil, because in supplying food we change the character of the soil. The rose requires a compact soil; one approaching clay is best, but by applying cow manure we make the soil so light that the roots suffer. The Manetti stock is adapted to heavy as well as light soils. Mr. Strong alluded to the rose grafted on a Japan stock, exhibited by Mr. Dawson of the Arnold Arboretum, and said that he was struck with the result, but his own experience with that stock had not been satisfactory. The plants have not flourished as well as those on the Manetti stock. They have done well at the Arboretum, in light soil, out-doors, and have also succeeded in pots. There is no reason why we should not propagate roses here as readily as abroad; cuttings of soft wood root freely, and we can graft the Manetti stock with scarcely a miss; budding is not so successful. For the public, grafting is the best way of procuring plants.

Mr. Strong thought exhibitions of roses very misleading, and that there should be some way of making distinctions that would guide the public. The visitors are enthusiastic, and get the varieties they see in the prize stands, and are doomed to disappointment, because they are unable to give them the care requisite to

produce perfect blooms, and it cannot be expected that the public generally ever will give such care. He agreed with the last speaker that the new roses, with delicate shades of color, are of doubtful permanent success, though possibly care may preserve them. Our exhibitions rival those of England, but the new hybrid kinds cannot be produced by the public generally. They want hardy kinds, like Baron Prevost, though they may not take the first prize. If we lead the public up to too high a plane, they will be discouraged and give up; but there are roses that can be produced by the majority of cultivators with great success, and that will give great satisfaction.

John G. Barker agreed with the last two speakers in regard to the advantage of changing the soil for roses; where there are but a few beds it is not difficult to change the plants and the soil. There is no doubt that beds of roses can be made beautiful through the season. He covers the soil in his beds with pine needles, and plants gladioli between the bushes, which hide the mulching, and then edges with candytuft, sweet alyssum, or mignonette. The kinds he has selected are all among those mentioned by Mr. Spooner. He cultivated Safrano, Bon Seline, and other tender kinds in a bed at the Botanic Garden, where they stood for several years. They were covered with leaves, and stakes were driven down, with cross pieces firmly fastened to the tops so that heavy snows should not break down the bushes. If taken up and put in frames they are preferable to bands of coleus and iresine for ornament. Both hardy and tender kinds can be made to yield such effects as cannot be produced by bedding plants.

Mr. Strong spoke of the Japanese *Rosa rugosa* as of very luxuriant and dense growth and fine foliage. It is beautiful in bud and flower (though the flowers are single), and also when the hips are ripe. It produces a striking effect at a distance.

Mr. Barker recommended grouping this species on the shady side of beds of hardy shrubs.

Mr. Wood said that a few years ago he set out twenty-four Bon Seline and the same number of Safrano roses, and put boards round them and tied down and covered the plants, and they came out in spring in excellent condition, but he did not cut a perfect bloom before the first of September, which was not long before they were cut off by frost. Both these kinds will form buds freely all

summer, but the hot sun burns them, and therefore such a bed must be partially shaded; it will not do in the full sun.

Mr. Beard agreed with Mr. Wood in regard to tender roses, and said that he had planted thirty or forty bushes, which have stood the winters. The varieties chosen by Mr. Wood were not so good for the purpose as the more double kinds, such as Homer, Agrippina, and Souvenir de la Malmaison, which come to greater perfection. There is no question that they are hardy enough to stand the winter with sufficient covering. If they are killed down they will send up strong shoots, but will give no bloom until cool weather.

Mr. Spooner said that Gloire de Dijon, Devoniensis, etc., came through the winter with protection, but did not flower freely.

Hon. Marshall P. Wilder said that this discussion showed that the Society has made great progress in the fundamental principles of rose culture, and in establishing what constitutes a good rose, desirable for general cultivation here. Many years ago he carried off the Society's prize for the best collection of roses, for nine successive years. Since then he has seen great changes; we have learned to classify the collections, which were then miscellaneous, and have learned the constituents of a perfect rose. Many of the varieties mentioned by Mr. Spooner have taken their places as permanently as the Baldwin apple or Bartlett pear. Baronne Prevost, John Hopper, and Dr. Andry, have such constituents of excellence that, though better kinds in some respects may exist, all things considered they will retain their places for years to come. We have already got large collections of roses, but we desire fragrance, and hybridizing with Tea roses gives this, but it also gives tenderness, yet, by covering them up, and great care, we can carry the Hybrid Tea roses through the winter and get some good blooms, but they will never be permanent dwellers in our gardens. The Salet and Laneii are the only moss roses he cultivates; the latter is robust, and, unlike most moss roses, makes good roots. Mr. Wilder related an anecdote of George C. Thorburn, who imported a lot of the Common Moss rose, and wrote back to the European nurseryman that our American cultivators preferred roses with roots. The Laneii is hardy and a strong grower; it will take care of itself, and will not be displaced. It is of better color than the Common Moss, but not quite so mossy. The Manetti stock was introduced by Thomas Rivers fifty years ago, and the speaker had never found one equal to it; but the

rose grower must be wide awake, and not let the suckers from the stock rob the graft. The stock must be buried below the surface. He wondered that more varieties of Hybrid Perpetual roses had not been produced here, and spoke of the success attained by the late Henry B. Ellwanger in this direction, and of the loss to horticulture in his death. Mr. Ellwanger's effort was to add fragrance to the Hybrid Perpetual rose, and he had produced one as good as the Alfred Colomb, which he named for the speaker.

President Hayes said that he had learned from these discussions how to cultivate roses. He had been successful in growing them, and believed in changing the soil; they do not give satisfaction when remaining in one place for a long time.

Mr. Strong dissented from the opinion that grafted roses generally root from the graft. His experience had been that it happens only in rare instances, and he doubted the advantage if they did, for the Manetti stock is so much more vigorous.

Mr. Spooner said that he knew that many varieties, among which are Prince Camille de Rohan, John Hopper, Magna Charta, Avocat Duvivier, and Jules Margottin, do root freely from the graft.

On motion of E. W. Wood, a Committee, consisting of John B. Moore, William H. Spooner, E. W. Wood, William C. Strong and Marshall P. Wilder, was appointed to report a list of the best hardy roses as continuous bloomers in out-door culture, and a list of the best hardy roses adapted to general cultivation.

The subject for the next Saturday was announced as "Manures; their Preparation and Application."

REPORT

OF THE

COMMITTEE ON PLANTS AND FLOWERS,

FOR THE YEAR 1883.

By WILLIAM H. SPOONER, CHAIRMAN.

At the close of the year's official duties, there is some satisfaction in taking a brief retrospect of its work. While our position involves weekly labor and responsibility, there is compensation in the endeavor to add something to the general interest in floricultural subjects.

The exhibitions, as a whole, have not reached the standard of former years, with the exception of the Annual and Chrysanthemum Shows; the former, in choice plants, was uncommonly fine, and the latter was never equalled. It is many years since cultivators have had to contend with such a long-continued season of extreme drought, and it undoubtedly affected the general exhibits.

We desire to call attention in the Prize Schedule for 1884, to the changes in the Azalea and Rose show in March, particularly to the additional prizes for bulbs, which it is hoped will greatly add to the interest and success of the show; to the additions at the Rose Exhibition, in June, and also to the important changes and additions to the prizes for the Chrysanthemum Show.

We will first notice the

AZALEA AND ROSE SHOW.

MARCH 22.

For the display of Indian Azaleas, we were again indebted to Hon. Marshall P. Wilder, whose enthusiasm in the cultivation of this beautiful plant continues unabated. The prizes were all awarded to Col. Wilder, with the exception of one for a specimen plant, to John L. Gardner.

Hybrid Perpetual Roses, in pots, were very poor. Of cut blooms, an unusually fine display was made by John B. Moore & Son and William C. Strong; there were also splendid blooms of Maréchal Niel, from E. M. Wood & Co., — the largest and most perfect specimens of this rose ever shown in our Hall. Mr. Wood's facilities for growing this beautiful rose are unsurpassed; he could cut at one time about ten thousand blooms.

Orchids were exhibited by H. H. Hunnewell and F. B. Hayes. Greenhouse plants were shown by H. H. Hunnewell and John L. Gardner. There was no exhibit of hardy shrubs, cyclamens, pansies, or tulips. Fine Heaths were shown by Francis B. Hayes and John L. Gardner; the latter also exhibited excellent Primulas. Good Cinerarias were presented by William Patterson, and the best violets shown for several years were also from him, and from John L. Gardner. The latter was the only contributor of forced bulbs, and, as usual, excelled in well-grown hyacinths. Camellias were exhibited by Francis B. Hayes, Hovey & Co., and Marshall P. Wilder.

E. M. Wood & Co. contributed a group of the beautiful *Lilium eximium Harrisii*.

Woolson & Co., of Passaic, N. J., presented an interesting collection of Narcissus, a class of plants rapidly becoming popular for forcing and for garden culture. E. L. Beard's display of Fancy Pansies, was remarkable, not only for the wonderful beauty and variety of color, but for the large size and perfect form of the flowers; they were the best ever shown.

Henry R. Comley exhibited seedling carnation No. 1; color, pure white, serrated edges, perfect flower, with no indication of bursting; very fragrant and a free bloomer. Also, No. 2, white, inner petals delicately tinted pink, serrated edges; and No. 3, creamy white, serrated edges.

PELARGONIUM EXHIBITION.

May 12.

This was again a failure, not a single competitor offering for any of the prizes for pelargoniums.

John L. Gardner and Marshall P. Wilder were contributors of Indian Azaleas; from the latter came Louis Van Houtte; color, delicate rose, edged white, lower divisions dark purple; also,

Mme. Iris Lefebvre, color pure white, striped with pink; and Jean Vervaene. The most noticeable plant of the exhibit was from S. R. Payson, viz: *Dendrobium Falconeri.*

Admirably grown Tulips were shown in good varieties by John L. Gardner, and Hyacinths by Miss E. M. Harris. From William A. Bock came excellent seedling Pelargoniums; there were also fine named kinds from E. Sheppard.

RHODODENDRON SHOW.

June 9 and 13.

The dry weather proved a serious drawback to this exhibition, and the postponement of the awards of the Hunnewell Premiums from the 9th to the 13th was an unfortunate error in judgment on the part of the Committee. H. H. Hunnewell and President Hayes contributed fine blooms on the 9th and also on the 13th (the former not competing for the prizes), but the very warm weather had seriously affected the flowers by the 13th.

President Francis B. Hayes was the chief contributor for the leading prizes, receiving the first prizes for twenty-four, twelve, six, and three tender varieties; and also for a single truss of any tender variety, which he took with Duchess of Bedford.

John L. Gardner was first for eighteen hardy varieties, and Hovey & Co. were second. President Hayes was first for ten hardy varieties.

E. Sheppard was the only contributor of Hardy Azaleas, and received the first prize. The awards for Tree Pæonies and German Iris were made on the 9th; the first, as usual, to Marshall P. Wilder; and that for Iris, to Francis B. Hayes.

Cut flowers were excellent, the display being made by W. K. Wood, Mrs. E. M. Gill and Miss S. W. Story.

Hardy Clematis were shown, of better quality than for several years, by Joseph H. Woodford, and John B. Moore & Son.

Francis Parkman presented some very good seedling Ghent Azaleas.

From Hovey & Co. came seedling Cereus No. 2, C. M. Hovey. From the same came also a semi-double seedling Azalea; color, pure white with lemon centre.

ROSE AND STRAWBERRY EXHIBITION.

JUNE 26.

Probably no plant suffered more from the extremely dry season than the Rose, especially when this followed a severe winter like the last; from these causes the Annual Rose Exhibition did not equal that of last year. A large number of flowers were shown, but none of them were of superior quality. Sunday and Monday immediately preceding the show, were among the hottest days of the season, so that many of the best blooms were burned on the bushes. Such varieties as Alfred Colomb, E. Y. Teas, and Boieldieu, were destroyed for exhibition purposes; even Mme. Gabriel Luizet, one of the finest of all roses for general culture, could not bear the severe scorching, while the dark varieties, such as La Rosière, Abel Carrière, Prince Camille de Rohan, Jean Liabaud, and Mons. Boncenne, were badly burned. The principal contributors were John B. Moore & Son, John L. Gardner, Francis B. Hayes, Warren Heustis, John S. Richards and William H. Spooner. Ellwanger & Barry, of Rochester, N.Y., presented a large collection.

SUBSCRIPTION PRIZES FOR HYBRID PERPETUAL ROSES.

These were again sharply contested for.

A Silver Vase, value $50, for twenty-four roses of different varieties was awarded to John L. Gardner; no list of varieties was furnished.

A Silver Vase, value $15, for three roses of different varieties, to Warren Heustis.

A Silver Vase, value $25, for six roses of different varieties, to John S. Richards.

A Silver Vase, value $15, for three Roses of one variety, to John L. Gardner for Abel Carrière.

A Silver Vase, value $25, for six roses of one variety, to Francis Skinner, Jr., for Charles Lefebvre.

A Silver Challenge Vase, value $200, for twenty-four varieties, three specimens of each, to John B. Moore & Son, for the second time. The varieties shown were:

Abel Carrière,	Annie Wood,
Alfred Colomb,	Baroness Rothschild,

Boieldieu,
Camille Bernardin,
Comtesse de Serenye,
François Michelon,
Hippolyte Jamain,
Jean Soupert,
Magna Charta,
Marchioness of Exeter,
Maurice Bernardin,
Mme. Boutin,
Mme. Gabriel Luizet,
Mme. Marie Finger,
Mme. Victor Verdier,
Mons. Boncenne,
Paul Neyron,
Perfection de Lyons,
Pierre Notting,
Prince Camille de Rohan.
Souvenir de Spa,
Thomas Mills.

SOCIETY'S PRIZES.

For twenty-four distinct varieties, two of each, John B. Moore & Son were first, with

Alfred Colomb,
Baroness Rothschild,
Barthélemy Joubert,
Boieldieu,
Camille Bernardin,
Caroline de Sansal,
Charles Turner,
Duke of Connaught,
Duke of Edinburgh,
Dupuy Jamain,
Étienne Levet,
Fisher Holmes,
Jean Liabaud,
Jean Soupert,
Marie Baumann,
Marguerite de St. Amande,
Mme. Victor Verdier,
Paul Neyron,
Prince Camille de Rohan,
Richard Laxton,
Richard Wallace,
Senateur Vaïsse,
Souvenir de Spa.
S. Reynolds Hole,

For the best twelve and six, J. S. Richards was the successful competitor; no list of varieties was furnished.

MOSS ROSES. — For the best six, the first prize was awarded to John B. Moore & Son; for the best three, to William H. Spooner, for Crested, Common, and White Bath.

All the prizes for the general display were awarded, the contributions being numerous; the first was gained by Norton Brothers.

STOVE AND GREENHOUSE PLANTS. — The best six varieties were contributed by John L. Gardner and Hovey & Co. For a single specimen, the first prize was given to John L. Gardner, for *Erica ventricosa Bothwelliana*. Of Orchids, three varieties were presented by F. L. Ames and R. M. Pratt, receiving the first and

second prizes, respectively. For a single plant, the prize was awarded to H. H. Hunnewell, for *Odontoglossum vexillarium*. A miscellaneous collection of Orchids was exhibited by F. L. Ames.

Clematis were shown by Francis B. Hayes; excellent seedling Gloxinias by John B. Moore & Son; displays of flowers by E. Sheppard, Mrs. L. P. Weston, Miss S. W. Story, and Mrs. E. M. Gill. From C. J. Power came a collection of plants grown in moss, and from John C. Hovey came the Herbaceous Pæony, No. 3, Grandiflora; flower large, very double, opening flat; color, light rose, very fragrant,

ANNUAL EXHIBITION.

SEPTEMBER 18, 19, 20, AND 21.

The arrangement of this exhibition was entirely different from any adopted in former years, and it seems to us a change in the right direction. The plant and flower department of our shows is constantly increasing, and it has been apparent for several years that more room was needed for the proper display of the plants. This year the entire upper hall was devoted to plants and flowers, the former being arranged on platforms on each side of the hall, in front of the mirrors, thus giving more space to each contributor. The reflection of the plants in the mirrors, added greatly to the general effect. Between the mirrors were stands for cut flowers, while in the centre of the hall tables were placed for miscellaneous displays of plants and flowers. This arrangement proved much more satisfactory to exhibitors, and a large number of visitors expressed their appreciation of the change.

STOVE AND GREENHOUSE PLANTS. — In the display of these, F. L. Ames was first, with

Alocasia Sedeni,
Alocasia Thibautiana,
Alocasia zebrina,
Anthurium Veitchii,
Anthurium Warocqueanum,
Asparagus plumosus nanus,
Croton Mortii,
Dion edule,
Kentia australis,
Maranta Makoyana,
Maranta Veitchii,
Phyllotœnium Lindeni.

In SPECIMEN FLOWERING PLANTS, President Francis B. Hayes received the first prize for six varieties. For a single specimen,

F. L. Ames was first and second with *Dipladenia Boliviensis* and *Epidendrum prismatocarpum*.

For Variegated Leaved Plants, six varieties, Hovey & Co. were first, with

Alocasia macrorhiza,	*Eurya latifolia*,
Ananassa sativa,	*Phormium Colensoi*,
Dieffenbachia Bausei,	*Yucca quadricolor*.

The best single specimen came from John L. Gardner, *Eurya latifolia var.*

For Caladiums, the first and second prizes were awarded to Waldo Adams.

For Ferns, six varieties, to F. L. Ames, for

Davallia Mooreana,	*Nephrolepis davallioides furcans*,
Gleichenia Mendelii,	*Polypodium ornatum*.
Lastræa Richardsii multifida,	
Microlepia hirta cristata.	

Mr. Ames was also first for Adiantums, with

A. concinnum latum,	*A. scutum*,
A. Peruvianum,	*A. trapeziforme*,
A. princeps,	*A. Williamsii*.

For a Tree Fern, Hovey & Co. were first with *Alsophila australis*.

Dracænas, six varieties, came from S. R. Payson, viz.:

D. amabilis,	*D. Hendersonii*,
D. Baptistii,	*D. Shepherdii*,
D. Goldieana,	*D. Youngi*.

For Crotons, F. L. Ames was first, with

Baron Frank,	Neville,
Cronstadti,	Prince of Wales,
Hawkeri,	Queen Victoria.

For a single specimen of Palm, the first prize was awarded to Hovey & Co. for *Pritchardia Pacifica*.

Nepenthes, — three plants; the first prize for these was awarded to F. L. Ames, for *N. Hookeriana*, *N. Intermedia*, *and N. Rafflesiana*.

AGAVES, CACTI, and SUCCULENTS were shown by Hovey & Co., receiving prizes.

GLADIOLI.—This part of the exhibit was perhaps the poorest for many years, owing doubtless to the drought; E. Sheppard was the only contributor.

DAHLIAS were excellent, from John L. Gardner, Francis B. Hayes, C. W. Hoitt, of Nashua, N. H., James Willey, and John Parker.

CUT FLOWERS, considering the unfavorable season, were remarkably good, Mrs. E. M. Gill, Mrs. L. P. Weston, and President Hayes, being the contributors.

One of the most attractive and interesting features of the exhibition, was a collection of *Nymphæas*, *Victoria regia*, and *Nelumbium speciosum* from E. D. Sturtevant of Bordentown, N. J. This exhibit was made at the request of your Committee, and the result fully justified their efforts; the two tanks which Mr. Sturtevant filled with flowers and leaves were constantly surrounded by admiring visitors, and were the special novelties of the display.

Mr. Sturtevant has kindly furnished us with the following detailed account of his method of culture:

"I have a basin in my garden, built of brick and cement, fifty feet by thirty-six, and two and a half deep. I find that in such a basin, the water is more readily warmed by the sun than in a pond with a bottom of natural earth. This extra warmth is of the greatest service in growing the tender Nymphæas, and is no detriment whatever to the growth and health of the hardy ones. Soil is not spread over the whole bottom of the basin, but is placed in compartments of cemented brickwork, about ten or twelve inches deep, or in wooden boxes, placed at various intervals. Abundant root room, and room for the spread of the foliage is necessary for the development of fine specimens. Soil from the bed of a pond or river is not at all essential. The compost which I use is simply ordinary garden loam and good horse or cow manure, in nearly equal quantities. The hardy varieties are planted out permanently. Of the tender varieties, such as *Nymphæa Devoniensis*, *N. dentata*, etc., in March or April I take tubers about the size of a hickory nut, pot them in three-inch pots, and place in a tank of water under glass, which is kept steadily at a temperature of about 80°. They soon begin to grow and are shifted perhaps once into larger pots before planting out. Early in June, or as soon as the water is

warm enough for bathing with comfort, the young plants are turned out of the pots into the beds of soil in the basin. No artificial heat whatever was given, after planting out, to the plants which bore the flowers exhibited by me in Boston. Grown in this manner, *N. Devoniensis* and *N. dentata* have produced flowers twelve inches, and leaves twenty-five inches, in diameter, a single specimen covering a space twenty feet across.

No attempt is made to winter very large flowering crowns; they are worthless, and only the small tubers which form around the flowering plant during the growing season are preserved. These ripen off and shed their leaves in autumn, and are placed, a quantity together, in ordinary flower-pots, and covered with clean sand. These pots are placed in tubs or tanks of water in a greenhouse. The tubs are placed in some position where the water is kept at a temperature of 60°. Treated in this manner the bulbs generally remain dormant until spring; though they may be wintered in a lower temperature, I have found 60° the safest. The purple and blue species are increased only by seed. Young plants of these, kept in pots during the summer, will in autumn ripen off into tubers which are wintered in the same manner as the other kinds. The following is a list of those exhibited:

Nymphæa albâ candidissima,	*Nymphæa pygmæa,*
" *dentata,*	" *Zanzibariensis,*
" *Devoniensis,*	" *rubra,*

The leaves and flowers of the *Victoria regia* exhibited, were taken from a plant grown in the open air, with the aid of some artificial heat. It was raised from a seed which germinated about Christmas, 1882. The plant produced its first flower July 20, 1883.

New and Desirable Plants. At this Exhibition we had from Messrs. Hovey & Co., a plant of *Ficus elastica aurea var.*, a new variety of recent introduction—a form of India-Rubber plant, with pretty golden-edged leaves.

From F. L. Ames, *Nepenthes Mastersiana*, described as a handsome hybrid between *N. sanguinea*, and *N. distillatoria*, the pitchers large, cylindrical, and of a deep red color. Also *Aralia Chabrieri*, an elegant small growing species, with linear leaves of a deep green color, the midrib bright orange.

From H. H. Hunnewell, *Cattleya aurea*, in the way of *C. Dowiana*, but rather lighter in color; and *Osmanthus ilicifolius var.* (Japan

Evergreen Oak). Mr. Hunnewell also exhibited a beautiful assortment of plants, which were not entered for competition in the prize collections.

From David Allan, gardener to R. M. Pratt, *Polypodium plumosum*. The general collection of plants, including Crotons, Ferns, and Lycopods, of Mr. Allan, was one of the most attractive and useful to the horticulturist ever made in our exhibitions, and reflected great credit upon the cultivator.

NATIVE FLOWERS were largely contributed by Mrs. P. D. Richards, E. H. Hitchings, Carrie S. Leeds, Frank H. Forbes and Mrs. G. R. Peckham.

From E. & C. Woodman came a new Coleus, Progress.

Miss E. H. Craft and Miss Annie M. Tilley presented designs of dried flowers.

CHRYSANTHEMUM SHOW.

NOVEMBER 8 AND 9.

The opportunity of observing the "Glory Flower" in all its varied hues, was this year far superior to any previous occasions, the collections of plants being larger and finer than ever before.

Dr. H. P. Walcott staged a large and elegant variety, as did also E. W. Wood. Norton Brothers, Marshall P. Wilder, John L. Gardner, and Hovey & Co., furnished excellent plants, but of a smaller size than the first two exhibitors. Cut Chrysanthemums were shown by Edwin Fewkes, H. P. Walcott, the State Lunatic Hospital, at Worcester, and E. W. Wood, to whom were awarded the prizes. Cut blooms were also shown by Mrs. E. M. Gill, Mrs. L. P. Weston, E. Sheppard, W. H, Lincoln, and V. H. Hallock, Son, and Thorpe, of Queens, N. Y.

For six Chrysanthemum plants, Large Flowered varieties, H. P. Walcott was first, with

Empress of India,	Lady Hardinge,
Fingal,	Nil Desperandum,
Jardin des Plantes,	Prince of Wales.

E. W. Wood was second, with

Bouquet Fait,	Hiver Fleuri,
Elaine,	Peter the Great,
Fair Maid of Guernsey,	The Damio.

For four Pompon Chrysanthemums, H. P. Walcott was first, with

Curiosity,	Mlle. Marthe,
Salamon,	Golden Mlle. Marthe.

E. W. Wood was second, with

Golden Circle,	Mongolfier,
Semiramis,	Mlle. Marthe.

For a specimen plant, Large Flowered, the first prize was awarded to H. P. Walcott, for Crimson King, and the second to E. W. Wood, for Snowball.

For a specimen plant, Japanese, the first prize to H. P. Walcott, for Triomphe du Châtelet, and the second prize to E. W. Wood, for Elaine.

For a specimen plant, Pompon, the first prize was awarded to E. W. Wood, for Golden Circle, and the second to H. P. Walcott.

For display of plants of all classes, the first prize was given to H. P. Walcott, the second to E. W. Wood, and the third to Norton Brothers.

For twelve cut blooms, Large Flowered or Chinese, the first prize was taken by Edwin Fewkes, with

Antonelli,	Mabel Ward,
Baron Beust,	Pink Perfection,
Crimson King,	Prince Victor,
George Peabody,	Sunflower,
Jardin des Plantes,	Venus,
Lord Derby,	White Eve.

The second prize went to H. P. Walcott, and the third to the State Lunatic Hospital at Worcester.

For six cut blooms, the first prize was awarded to Edwin Fewkes, for

Empress of India,	Miss Mary Morgan,
Guernsey Nugget,	Prince of Wales,
John Salter,	Temple of Solomon.

The second to H. P. Walcott, for

Crimson King,	Lord Wolseley,
Empress of India,	Prince Alfred,
John Salter,	Queen of England.

The third prize was awarded to E. W. Wood.

In the display of thirty varieties of Pompon and Japanese cut blooms, H. P. Walcott was first, Edwin Fewkes second, E. W. Wood third, and the State Lunatic Hospital, Worcester, fourth.

Seedling Chrysanthemums were again shown in considerable numbers, grown from American seed, and were remarkably fine. Dr. H. P. Walcott exhibited a number of new varieties in cut blooms, several of them with very noticeable flowers. His seedling, Pontiac, raised two years ago, evidently of the same parentage as the variety President Parkman, which it resembles in habit of growth, foliage, and time of flowering, is very full, of a soft canary color, a profuse and early bloomer, and thus far has resisted mildew in a very marked way.

E. W. Wood also exhibited some very excellent seedlings, grown from seed raised by himself; several of them were equal to some of the kinds now in commerce.

For ORCHIDS, three varieties: the first prize was taken by F. L. Ames, with *Vanda cærulea*, *Cypripedium Sedeni* and *Odontoglossum Andersoni*, and the second by E. W. Gilmore, with *Oncidium ornythorhynchum*, *Lycaste Skinneri* and *Oncidium Forbesii*.

For a single plant, the first prize went to F. L. Ames for *Cypripedium Harrisianum*, and the second to E. W. Gilmore for *Dendrobium formosum*.

David Allan, gardener to R. M. Pratt, exhibited a beautiful specimen, the finest ever shown here, of that curious plant, *Ouviranda fenestralis*, the Lace or Skeleton plant, for a description of which see "Curtis's Botanical Magazine," Vol. 82, plate 4894. Mr. Allan also presented a very beautiful and rare collection of cut flowers.

F. L. Ames supplied a miscellaneous collection of orchids and cut flowers.

MISCELLANEOUS EXHIBITS.

Camellias were shown by President Francis B. Hayes, for several weeks in succession, of finer quality than ever before.

January 2d, W. C. Page exhibited a seedling Carnation, called Victor; color, bright crimson pink, striped, edges serrated, fragrant.

February 17th, several seedling Carnations were shown by Sewall Fisher, viz.:

Fisher's Early White, raised in 1878, from pistillate parent, Degraw; very early, pure white, very fragrant, and with no indication of bursting.

Anna Webb, a large flower of deep crimson-maroon color, serrated edges; very fragrant, does not burst.

Dana, bright pink color, not large.

Jessie Lee, a large flower, white edges striped with pink, bursts.

Maria, color, rosy white, striped with dark pink, some of the petals clear rose.

Marion, a seedling of 1882; pistillate parent, Early White; staminate parent, Cardinal; color, creamy white, the edges of the petals delicately pencilled with deep pink lines; no indications of bursting in the flower.

Shawmut, a seedling of 1882; staminate parent, Astoria; ground color pale yellow, edges flecked with red.

Mr. Fisher has entered his seedling carnation, Fisher's Early White, for the Prospective Prize for a seedling flowering plant. Your Committee at the invitation of Mr. Fisher, visited his establishment at Framingham Centre, in December, 1882, when they saw this carnation growing in perfection, together with other seedlings. Mr. Fisher claims for it earliness and productiveness, and under his culture it fully justified the claim; the plants looked healthy, and were full of buds and flowers; the beds were mulched with tobacco stems, which seems to be an excellent system for promoting the health of the plants. As this variety is in the hands of several cultivators, the Committee prefer to wait another year, before recommending any further award.

April 9th, V. H. Hallock, Son, & Thorpe of Queens, N. Y., sent a large collection of seedling carnations which reached the rooms too late for the meeting of the Committee. The collection contained some very good varieties; the flowers were considerably wilted before the Chairman saw them, but the following varieties seemed the most noticeable:

Black Knight, very dark.

Charles Henderson, bright pink, fringed.

Cymbeline, bright lemon, bordered and flaked orange.

Fairy, white, beautifully scalloped purple.
Jeanette, pure white.
Mrs. A. Rolker, delicate rose, fringed.
Petunia, white, bordered and flaked purple.
President Wilder, very dark maroon, fringed.
Robert Manning, scarlet.
Valentine, white, deeply flaked and edged pink.

February 18th, H. H. Hunnewell exhibited a magnificent collection of cut Orchids in variety; the finest display ever made before the Society. The same day came from President Hayes an excellent specimen of the beautiful *Clianthus Dampieri*, and from John L. Gardner a bunch of fifty flowers of the charming violet Marie Louise, the finest samples of this variety that we have ever seen, being immense double flowers.

March 3d, Edward L. Beard presented an admirable group of Hyacinths, Lily of the Valley, and Narcissus; and again on the 10th, a fine collection. Hon. Marshall P. Wilder exhibited Azaleas in bloom, two years from the seed.

March 31st, from F. L. Ames came a collection of cut Orchids excelling anything of the kind he has ever before shown.

During the early spring months, John B. Moore & Son and William C. Strong were frequent exhibitors of Hybrid Perpetual Roses, making larger and more frequent displays than ever before.

April 7th, Edwin Fewkes placed upon the tables two new heliotropes, Swanley Giant—very large, and White Lady.

April 14th, from Woolson & Co., Passaic, N. J., came *Primula Sieboldii* in variety, Narcissus, and *Chionodoxa Luciliæ*, or Glory of the Snow.

April 21st, Marshall P. Wilder sent Azalea Mme. Charles Van Eeckhaute, color, pure white, crisped petals.

July 7th, Francis Parkman exhibited a beautiful and striking collection of Venetian Poppies in various colors.

July 14th, Dr. H. P. Walcott presented a group of Delphiniums, which have never been excelled, if equalled; the flower spikes were large, full and perfect in form.

August 11th, William H. Spooner placed on the table a seedling Gladiolus, No. 500; in color, the three or sometimes four or five lower divisions bright lemon shading to white, tipped scarlet; the other divisions rosy carmine to scarlet, a white line running through each petal; full spike, strong grower. Also No. 501, a

cross between Diamond and Richard Cœur de Lion; color, pale rose, profusely striped with carmine pink, a white stripe extending through the centre of each of the upper divisions; purple throat, similar to Richard Cœur de Lion; lower divisions deep carmine pink; a strong grower.

Notwithstanding the excessively dry weather of the season, the exhibition of Gladioli was much finer in prize varieties than for several years. Those of Mrs. T. L. Nelson and O. B. Hadwen, of Worcester, were remarkably good, as were also those of F. Bacheller, of Lynn.

Messrs. C. L. Allen & Co., of Queens, N. Y., presented a very good variety of Seedling Gladioli, three varieties of which they had named Martha Washington, Emma Thursby, and Bayard Taylor.

The general display of miscellaneous flowers was one of the best of the season. President Hayes contributed a choice collection of Hybrid Perpetual Roses, Dahlias, etc., Warren Heustis about two dozen very excellent specimens of the same; and Edwin Fewkes, fine roses. Ex-President J. F. C. Hyde, presented a group of his beautiful Gladiolus, Hyde's White; James Cartwright exhibited fine seedling Gladioli; from Mrs. L. P. Weston came a large collection of cut flowers, and from E. L. Beard a small number of flowers of his excellent strain of seedling Tuberous Rooted Begonias. O. B. Hadwen was awarded the prize for a single spike of Gladiolus, the variety being Baroness Burdett-Coutts.

F. Bacheller was first for ten spikes, with

Andromeda,	Jupiter,
Arabi Pasha,	Leander,
Baroness Burdett-Coutts,	Marie,
Beatrix,	Meyerbeer,
Carnation,	Parmentier.

In Phlox Drummondi, Mrs. T. L. Nelson was first with an admirable collection in well assorted varieties. President Hayes contributed the variety Violacea, of very deep color. From John C. Hovey, came *Montbretia crocosmæflora.*

August 25th, Asters were shown, which were remarkably good considering the dry weather, by E. Sheppard, John L. Gardner, Francis B. Hayes, James Nugent, M. B. Faxon, and Mrs. E. M. Gill.

From R. T. Jackson came *Campanula rotundifolia* var. *alba*, with a small white flower, collected at Trenton Falls, N. Y.

September 1st, the display of *Lilium lancifolium* and Tropæolums, was very meagre — the poorest for many years. In Single Dahlias, there was no competition for the prizes. Marigolds were of inferior quality.

Mrs. P. D. Richards presented a collection of twelve species of Solidago (Golden Rod), viz.:

S. altissima,	*S. neglecta*,
" *arguta*,	" *nemoralis*,
" *bicolor*,	" *odora*,
" *Canadensis*,	" *puberula*,
" *lanceolata*,	" *sempervirens*,
" *latifolia*,	" *serotina*.

September 8th, the exhibit of Double Zinnias was much larger than for several years, seven collections competing for the prizes. The first was awarded to Mrs. William Latham, the second to Hovey & Co., and the third to H. B. Watts.

Dianthus were also more extensively shown, and in finer assortments of colors; there were five competitors in this class, the first prize being given to E. Sheppard, the second to Mrs. Austin W. Ward, and the third to H. B. Watts.

September 20, President Hayes exhibited a single bloom of the new rose, White Baroness; color pure white, form like that of its parent, Baroness Rothschild.

The prizes for Herbaceous Plants have not attracted as much competitive interest as was hoped. Mrs. L. P. Weston has been the only continuous exhibitor through the season; her contributions have been excellent, instructive, and carefully named; lists of the varieties were furnished the Committee from week to week, and to her was awarded a Silver Medal for the greatest number of first prizes during the season, for Herbaceous Plants.

Prizes have been awarded from the Hunnewell fund to the amount of $70.00. The special appropriation of $100.00 for winter exhibits has all been awarded.

The amount of money prizes and gratuities awarded is $1,499, out of the appropriation of $1,500.

All of which is respectfully submitted.

WM. H. SPOONER,
JOS. H. WOODFORD,
JAMES CARTWRIGHT,
DAVID ALLAN,
F. L. HARRIS,
E. L. BEARD,

Committee on Plants and Flowers.

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

JANUARY 6.

Gratuities:—

Mrs. C. N. S. Horner, Cut Flowers,	$1 00
Mrs. E. M. Gill, " "	1 00
Miss S. W. Story, " "	1 00

JANUARY 13.

Gratuities:—

Francis B. Hayes, Camellias,	1 00
Mrs. E. M. Gill, Cut Flowers,	1 00

JANUARY 20.

Gratuities:—

Francis B. Hayes, Camellias,	3 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00

JANUARY 27.

Gratuities:—

James Cartwright, *Cypripedium insigne*,	2 00
Francis B. Hayes, Camellias,	1 00
Mrs. E. M. Gill, Cut Flowers,	1 00

FEBRUARY 3.

Gratuities:—

Francis B. Hayes, Camellias,	2 00
Jackson Dawson, Gen. Jacqueminot Roses,	1 00

FEBRUARY 10.

Gratuities:—

Francis B. Hayes, Camellias,	2 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. A. D. Wood, " "	1 00

FEBRUARY 17.

Gratuities:—

H. H. Hunnewell, Cut Orchids,	10 00
William C. Strong, Gen. Jacqueminot Roses,	2 00
Jackson Dawson, English Primulas,	2 00
Hovey & Co., Camellias,	2 00
Mrs. E. M. Gill, Cut Flowers,	1 00
Miss S. W. Story, " "	1 00

FEBRUARY 24.

Gratuities:—

Francis B. Hayes, Camellias,	$2 00
Hovey & Co., "	2 00
William C. Strong, Hybrid Perpetual Roses,	1 00
W. K. Wood, *Freesia refracta alba odorata*,	1 00
John L. Gardner, Violets in pots,	1 00
Mrs. E. M. Gill, Cut Flowers,	1 00
Miss S. W. Story, " "	1 00

MARCH 8.

Gratuities:—

Edward L. Beard, Hyacinths, Lily of the Valley, etc.,	4 00
James Cartwright, Cyclamen,	2 00
Francis B. Hayes, Camellias,	3 00
Hovey & Co., "	2 00
John L. Gardner, Marie Louise Violets,	1 00
John B. Moore & Son, Hybrid Perpetual Roses,	1 00
William C. Strong, " " "	1 00
Mrs. E. M. Gill, Cut Flowers,	1 00
Miss S. W. Story, " "	1 00

MARCH 10.

Gratuities:—

Francis B. Hayes, Camellias, Roses, etc.,	4 00
Hovey & Co., Camellias,	2 00
" " *Andromeda Japonica*,	1 00
Edward L. Beard, Hyacinths and Tulips,	3 00
William C. Strong, Hybrid Perpetual Roses,	2 00
Benjamin G. Smith, Gloxinias and Begonias,	1 00
" " " Seedling Abutilon,	1 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00

MARCH 17.

Gratuities:—

William C. Strong, Hybrid Perpetual Roses,	2 00
Francis B Hayes, Camellias and Roses,	2 00
Miss S. W. Story, Cut Flowers,	1 00

AZALEA AND ROSE SHOW.

MARCH 22.

INDIAN AZALEAS.—Six named varieties, in pots, Marshall P. Wilder,	$12 00
Two named varieties, in pots, Marshall P. Wilder,	8 00
Specimen plant, named, in pot, John L. Gardner,	5 00

INDIAN AZALEAS. — Four named varieties, in not exceeding ten-inch pots, Marshall P. Wilder, ... $8 00
Second, Marshall P. Wilder, ... 6 00
Single plant, of any named variety, in not exceeding an eight-inch pot, Marshall P. Wilder. 3 00
Second, Marshall P. Wilder, ... 2 00

HYBRID PERPETUAL ROSES.—Three plants, in not over eight-inch pots, distinct named varieties, Francis B. Hayes, ... 6 00
Second, John B. Moore & Son, ... 5 00
Twelve cut blooms, of six distinct named varieties, two of each, John B. Moore & Son, ... 6 00
Second, William C. Strong, ... 4 00
Six blooms, of four distinct named varieties, John B. Moore & Son, 3 00
Second, John B. Moore & Son, ... 2 00
Single bloom, of any named variety, Francis B. Hayes, Baroness Rothschild, ... 1 00

TENDER ROSES.—Twelve blooms of Maréchal Niel, E. M. Wood & Co., ... 3 00

ORCHIDS.—Three plants, in bloom, H. H. Hunnewell, . . . 8 00
Single plant in bloom, H. H. Hunnewell, *Odontoglossum Insleayi*, 3 00
Second, Francis B. Hayes, *Dendrobium nobile*, ... 2 00

GREENHOUSE PLANTS.—Specimen, in bloom, other than Azalea or Orchid, named, H. H. Hunnewell, *Chorozema varia*, . . 5 00
Second, John L. Gardner, *Imantophyllum miniatum*, . . 4 00

HEATH.—Single plant, in bloom, Francis B. Hayes, . . . 3 00
Second, John L. Gardner, ... 2 00

PRIMULAS.—Three plants, Single Flowered, of distinct varieties, in bloom, John L. Gardner, ... 2 00

CINERARIAS.—Four varieties, in not over nine-inch pots, in bloom, William Patterson, ... 4 00
Single plant, in bloom, William Patterson, ... 2 00

VIOLETS.—Six plants, in bloom, William Patterson, . . . 2 00
Second, John L. Gardner, ... 1 00

HYACINTHS.—Twelve distinct named varieties, in pots, one in each pot, John L. Gardner, ... 5 00
Six bulbs, in pots, distinct named varieties, one in each pot, John L. Gardner, ... 4 00
Single named bulb, in pot, in bloom, John L. Gardner, . . 2 00

NARCISSUS.—Four six-inch pots, two bulbs in each, in bloom, John L. Gardner, ... 3 00

JONQUILS.—Four six-inch pots, six bulbs in each, in bloom, John L. Gardner, ... 3 00

CAMELLIAS.—Display of named varieties, cut flowers with foliage, not less than twenty blooms, Francis B. Hayes, . . . 4 00
Second, Hovey & Co., ... 3 00
Six cut blooms, of six named varieties, with foliage, Hovey & Co., 3 00
Second, Francis B. Hayes, ... 2 00

CUT FLOWERS.—Display, filling fifty bottles, W. K Wood,	$3 00
Second, Miss S. W. Story,	2 00
HAND BOUQUETS.—Pair, Hovey & Co.,	3 00
Second, James Nugent,	2 00
BASKET OF FLOWERS.—Best arranged, Mrs. E. M. Gill,	4 00

Gratuities:—

Marshall P. Wilder, Collection of Azaleas,	12 00
E. M. Wood & Co., Cut Roses,	10 00
John L. Gardner, Hybrid Perpetual Roses,	1 00
" " " Polyanthus and Epacris,	3 00
Francis B. Hayes, Collection of Plants,	10 00
D. Zirngiebel, Pansies,	1 00
E. Sheppard, "	1 00
Henry R. Comley, Carnations and Bouvardias,	2 00
H. H. Hunnewell, *Chorozema Henchmanni*,	2 00
Benjamin G. Smith, Gloxinias,	1 00
Edwin Fewkes, Cut Flowers,	2 00
James Nugent, " "	1 00

MARCH 31.

Gratuities:—

F. L. Ames, Orchids,	12 00
John B. Moore & Son, Hybrid Perpetual Roses,	2 00
William C. Strong, " " "	1 00
Hovey & Co., Camellias, etc.,	2 00
Francis B. Hayes, Cut Flowers,	3 00
Mrs. A. D. Wood, " "	1 00
Miss S. W. Story, " "	1 00
Miss E. M. Gill, " "	1 00

APRIL 7.

Gratuities:—

John B. Moore & Son, Hybrid Perpetual Roses,	2 00
Hovey & Co., Camellias,	2 00
Edwin Fewkes, New Heliotropes,	2 00
Marshall P. Wilder, Azaleas,	2 00
John L. Gardner, *Anthurium Scherzerianum* and *Dendrobium chrysotoxum*,	2 00
E. Sheppard, Rhododendrons and Pelargoniums,	1 00
Francis B. Hayes, Cut Flowers,	3 00
Miss E. M. Gill, " "	1 00
Miss S. W. Story, " "	1 00

APRIL 14.

Gratuities:—

E. Sheppard, *Dendrobium Devonianum thyrsiflorum*,	3 00
Francis B. Hayes, *Franciscea eximia*, Azaleas, and other flowers,	3 00

Woolson & Co., Passaic, N. J., *Primula Sieboldii* in variety, Narcissus, and Chionodoxa,	$2 00
Hovey & Co., Camellias,	2 00
Edward L. Beard, Pansies, Anemone, and Polyanthus,	1 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. A. D. Wood, " "	1 00
Mrs. E. M. Gill, " "	1 00

APRIL 21.

Gratuities:—

Edward L. Beard, Lily of the Valley, in pots,	2 00
E. Sheppard, Pelargoniums and Azaleas,	1 00
Joseph Tailby, *Cypripedium villosum*,	1 00
Marshall P. Wilder, Azalea Mme. Charles Van Eckhaute,	1 00
Mrs. L. P. Weston, Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00
Miss S. W. Story, " "	1 00
Mrs. A. D. Wood, " "	1 00

APRIL 28.

Gratuities:—

Edward L. Beard, Pansies,	1 00
Mrs. A. D. Wood, Cut Flowers,	1 00

MAY 5.

Gratuities:—

Francis B. Hayes, *Erica speciosa*,	1 00
" " Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00
Miss S. W. Story, " "	1 00
W. H. Badlam, " "	1 00

PELARGONIUM EXHIBITION.

MAY 12.

INDIAN AZALEAS. — Single plant in pot, named, John L. Gardner,	$6 00
Second, Marshall P. Wilder,	5 00
Third, " "	4 00
TULIPS. — Twenty-four blooms, distinct named varieties, John L. Gardner,	4 00
Second, John L. Gardner,	3 00
HYACINTHS. — Twenty of different colors, Miss E. M. Harris,	5 00
TABLE DESIGN, other than a Basket of Flowers, Mrs. E. M. Gill,	4 00
Second, Miss S. W. Story,	3 00
HERBACEOUS PLANTS.—Largest and best arranged collection, correctly named, J. W. Manning,	2 00

Gratuities:—

William A. Bock, Pelargoniums,	$2 00
E. Sheppard, "	2 00
" " Fancy "	1 00
Dr. H. C. Meriam, *Caltha palustris fl. pl.*, and Pansies,	1 00
W. H. Badlam, Primulas and Anemones,	1 00
Miss L. P. Weston, Cut Flowers,	1 00
Mrs. A. D. Wood, " "	1 00

MAY 19.

Gratuities:—

Marshall P. Wilder, Azaleas,	2 00
E. Sheppard, *Cattleya Mossiæ*,	2 00
John C. Hovey, Narcissus,	2 00
Miss Anna C. Kenrick, Magnolias,	1 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00

MAY 26.

Gratuities:—

Hovey & Co., Plants and Flowers,	2 00
E. L. Beard, Primulas, Ranunculus, and Anemones,	1 00
Mrs. E. S. Joyce, Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00
E. H. Hitchings, Native Flowers,	1 00
Miss S. W. Story, Cut Flowers,	1 00

RHODODENDRON SHOW.

JUNE 9.

TREE PÆONIES.—Six named varieties, Marshall P. Wilder,	$3 00
GERMAN IRIS.—Twelve distinct varieties, Francis B. Hayes,	3 00
CUT FLOWERS.—Display, filling 100 bottles, W. K. Wood,	4 00
Second, Mrs. E. M. Gill,	3 00
Third, Miss S. W. Story,	2 00
NATIVE PLANTS.—Display of named species and varieties, one bottle each, E. H. Hitchings,	3 00
CLEMATIS.—Early named varieties, display of cut blooms, Joseph H. Woodford,	3 00
Second, John B. Moore & Son,	2 00
TABLE DESIGN, other than a basket of flowers, Miss S. W. Story,	4 00
Second, Mrs. E. M. Gill,	3 00

Gratuities:—

H. H. Hunnewell, Rhododendrons and Azaleas,	10 00
Francis B. Hayes, "	8 00
Hovey & Co., " and Azaleas,	3 00

Francis Parkman, Seedling Ghent Azaleas, ... $1 00
Benjamin G. Smith, Rhododendrons, Azaleas, and Clematis, . . 1 00
Jackson Dawson, Seedling " 2 00
" " Rare Shrubs, ... 2 00
James Cartwright, *Lælia purpurata*, ... 2 00

JUNE 13.

Postponement of Award of Hunnewell Prizes.

RHODODENDRONS.—Twenty-five tender varieties, named, Francis B. Hayes, ... 10 00
Twelve tender varieties, named, Francis B. Hayes, ... 6 00
Second, " " " 4 00
Six tender varieties, named, " " " . . . 3 00
Three tender varieties, named. " " " . . . 2 00
Single truss of any tender variety, named, Francis B. Hayes, for Duchess of Bedford, ... 1 00
Eighteen hardy varieties, named, John L. Gardner, . . . 10 00
Second, Hovey & Co., ... 6 00
Ten hardy varieties, named, Francis B. Hayes, ... 6 00
HARDY AZALEAS.—Any or all classes, fifteen named varieties, one truss each, E. Sheppard, ... 8 00

Gratuities:—

H. H. Hunnewell, Rhododendrons and Azaleas, ... 3 00
Francis B. Hayes, " 6 00
" " " *Erica ampullacea Barnsii*, ... 2 00
Hovey & Co,, Pæonies and Rhododendrons, ... 4 00
E. Sheppard, Azaleas and " 1 00
John B. Moore & Son, Clematis and Pæonies, ... 1 00
George Craft, Cut Flowers, ... 1 00

JUNE 16.

Gratuities:—

Francis B. Hayes, Rhododendrons, Roses, and Clematis, . . 3 00
William H. Spooner, Hybrid Perpetual Roses, ... 2 00
Benjamin G. Smith, " " " 1 00
Miss S. W. Story, Cut Flowers, ... 1 00
Mrs. E. M. Gill, " " 1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 26.

Special Subscription Prizes.

HYBRID PERPETUAL ROSES. — Twenty-four Roses, of different varieties, named, John L. Gardner, Silver Vase, value, . . $50 00

Three Roses of different varieties, named, Warren Heustis, Silver Vase, value, ... $15 00

Six Roses of different varieties, named, John S. Richards, Silver Vase, value, ... 25 00

Three Roses of one variety, John L. Gardner, for Abel Carrière, Silver Vase, value, ... 15 00

Six Roses of one variety, Francis Skinner, Jr., for Charles Lefebvre, Silver Vase, value, ... 25 00

Twenty-four varieties, three specimens of each, to John B. Moore & Son, to be held for three consecutive years, this being the second year of the award, Silver Challenge Vase, value, . 200 00

Society's Special Prizes.

HYBRID PERPETUAL ROSES.—Six blooms of Alfred Colomb, John B. Moore & Son, ... 4 00

Six blooms of Baroness Rothschild, Francis B. Hayes, . . . 4 00

Six blooms of Mme. Gabriel Luizet, John L. Gardner . . . 4 00

Six blooms of Mme. Victor Verdier, John B. Moore & Son, . 4 00

Six blooms of Mons. Boncenne, Francis B Hayes, . . . 4 00

Regular Prizes.

HYBRID PERPETUAL ROSES.—Twenty-four distinct named varieties, two of each variety, John B. Moore & Son, ... 12 00

Second, Warren Heustis, ... 10 00

Twelve distinct named varieties, John S. Richards, . . . 8 00

Second, John L. Gardner, ... 6 00

Third, Benjamin G. Smith, ... 4 00

Six distinct named varieties, John S. Richards, ... 4 00

Second, Francis B. Hayes, ... 3 00

Third, John L. Gardner, ... 2 00

MOSS ROSES.—Six named varieties, three clusters of each, John B. Moore & Son, ... 4 00

Three named varieties, three clusters of each, William H. Spooner, 3 00

Second, John B. Moore & Son, ... 2 00

TEA AND BOURBON ROSES.—Twelve cut blooms, named, Mrs. E. M. Gill, ... 3 00

GENERAL DISPLAY, of one hundred bottles of Hardy Roses, Norton Brothers, ... 7 00

Second, John S. Richards, ... 6 00

Third, John B. Moore & Son. 5 00

Fourth, Francis B. Hayes, ... 4 00

Fifth, William H. Spooner, ... 3 00

STOVE AND GREENHOUSE FLOWERING PLANTS, no Orchid admissible.—Six distinct named varieties, in bloom, John L. Gardner, 8 00

Second, Hovey & Co., ... 6 00

SPECIMEN PLANT, in bloom, other than Orchid, named, regard being had to new and rare varieties, John L. Gardner, . . . 4 00

Orchids.—Three named varieties, in bloom, F. L. Ames,	$6 00
Second, Robert M. Pratt,	5 00
Single plant, H. H. Hunnewell, for *Odontoglossum vexillarium*,	3 00
Sweet Williams.—Thirty trusses, not less than six distinct varieties, E. Sheppard,	3 00
Second, Hovey & Co.,	2 00
Vase of Flowers.—Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill,	4 00
Second, Miss S. W. Story,	3 00
Herbaceous Plants.—Collection, Mrs. L. P. Weston,	2 00

Gratuities:—

F. L. Ames, Orchids,	10 00
" " *Ixora Williamsii*,	2 00
Robert M. Pratt, Plants and Cut Flowers,	5 00
John C. Hovey, Herbaceous Pæonies,	3 00
Francis B. Hayes, *Yucca variegata*,	2 00
" " " Clematis,	1 00
A. P. Calder, *Nymphea* var.,	1 00
C. J. Power, Collection of Plants, grown in moss,	2 00
J. W. Manning, Evergreens,	2 00
E. Sheppard, Cut Flowers,	2 00
Mrs. L. P. Weston, " "	2 00
Miss S. W. Story, " "	2 00
Mrs. E. M. Gill, " "	2 00
E. H. Hitchings, *Kalmia latifolia*,	1 00
Frank H. Forbes, Wild Roses,	1 00

June 30.

Gratuities:—

Hovey & Co., Rhododendrons,	2 00
Jackson Dawson, Shrubs,	1 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. E. M. Gill, " "	1 00

July 7.

Hybrid Perpetual Roses.—Twenty-four blooms, of twenty-four distinct named varieties, in vases, John B. Moore & Son,	4 00
Second, William H. Spooner,	3 00
Delphiniums.—Six named varieties, Benjamin G. Smith,	3 00
Second, E. Sheppard,	2 00
Cut Flowers.—Display, filling one hundred bottles, W. K. Wood,	4 00
Second, Mrs. E. M. Gill,	3 00
Third, Mrs. L. P. Weston,	2 00
Table Design.—Best arranged, Mrs. E. M. Gill,	3 00
Herbaceous Plants.—Collection, Mrs. L. P. Weston,	2 00

Gratuities:—

Benjamin G. Smith, Delphiniums,	$1 00
Miss E. M. Harris, Lilies,	1 00
James Nugent, Sweet Peas,	1 00
Miss S. W. Story, Cut Flowers,	2 00
Hovey & Co., " "	2 00
E. H. Hitchings, Wild "	2 00

JULY 14.

GLOXINIAS.—Six distinct varieties, in pots, Edward L. Beard,	5 00
VASE OF FLOWERS.—Best arranged, in one of the Society's glass vases, W. K. Wood,	3 00
Second, Miss S. W. Story,	2 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston,	2 00
Second, A. McLaren,	1 00

Gratuities:—

Miss E. M. Harris, Hollyhocks,	2 00
E. L. Beard, Dahlias and Gloxinias,	2 00
Edwin Fewkes, Iris, Dahlias, etc,	1 00
John L. Gardner, *Erica juliana*,	2 00
John Robinson, *Tamarix Chinensis*,	1 00
Mrs L. P. Weston, *Asclepias tuberosa*,	1 00
James Nugent, *Lilium longiflorum*,	1 00
Miss S. W. Story, Cut Flowers,	1 00
Mrs. L. P. Weston, " "	2 00
Mrs. E. M. Gill, " "	1 00
Mrs. A. D. Wood, Basket of Flowers,	1 00
Mrs. A. J. Dolbear, Native Flowers,	2 00

JULY 21.

HOLLYHOCKS.—Twelve blooms, of twelve distinct colors, E. Sheppard,	4 00
Second, John L. Gardner,	3 00
Six blooms, of six distinct colors, Miss E. M. Harris,	2 00
Three blooms, of three distinct colors, Mrs. E. M. Gill,	1 00
CUT FLOWERS. — Display, filling one hundred bottles, W. K. Wood,	4 00
Second, Mrs. E. M. Gill,	3 00
Third, Mrs. L. P. Weston,	2 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston,	2 00

Gratuities:—

Jonas H. French, Orchids,	3 00
Hovey & Co., *Lilium Batemanni* and *L. Hoveyi*,	1 00
Miss E. M. Harris, Hollyhocks,	2 00
Mrs. E. M. Gill "	1 00
E. Sheppard, Phloxes,	1 00
James Nugent, Cut Flowers,	2 00
Miss S. W. Story, " "	2 00

JULY 28.

HYDRANGEAS.—Three plants of different varieties, in pots, the second prize to C. H. Hovey,	$3 00
PELARGONIUMS. — Six double and single varieties, named, the second prize to Mrs. E. M. Gill,	1 00
PERENNIAL PHLOXES.—Six distinct named varieties, one spike each, E. Sheppard,	3 00
SWEET PEAS.—Display, filling twenty-five bottles, James Nugent,	3 00
HERBACEOUS PLANTS. — Collection, Mrs. L. P. Weston,	2 00
Gratuities:—	
E. Sheppard, Phloxes and Hollyhocks,	2 00
Hovey & Co., Hydrangeas,	2 00
E. L. Beard, Tuberous Rooted Begonias,	1 00
Francis B. Hayes, Cut Flowers,	3 00
Mrs. L. P. Weston, " "	2 00
Mrs. E. M. Gill, " "	2 00
Miss S. W. Story, " "	2 00
Hovey & Co., " "	1 00
Mrs. A. D. Wood, Basket of Flowers,	1 00
W. K. Wood, Vase of Flowers,	1 00
Mrs. P. D. Richards, Native Plants,	1 00

AUGUST 4.

HYBRID PERPETUAL ROSES.—Twelve blooms, of twelve distinct named kinds, John B. Moore & Son,	3 00
Second, John B. Moore & Son,	2 00
STOCKS.—Six varieties, one cut plant of each, William Patterson,	2 00
BALSAMS.—Twelve spikes, not less than eight varieties, E. Sheppard,	2 00
CUT FLOWERS.—Display filling one hundred bottles, Francis B. Hayes,	4 00
Second, W. K. Wood,	3 00
Third, Mrs. E. M. Gill,	2 00
VASE OF FLOWERS.—The second prize to Mrs. A. D. Wood,	1 00
NATIVE FERNS.—Display, Mrs. P. D. Richards,	3 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston,	2 00
Gratuities:—	
John B. Moore & Son, Hybrid Perpetual Roses,	1 00
Francis B. Hayes, Petunias,	1 00
E. Sheppard, Dianthus and Dahlias,	1 00
Miss S. W. Story, Cut Flowers,	1 00
Edwin Fewkes, " "	1 00

AUGUST 11.

PERENNIAL PHLOXES.—Ten distinct named varieties, one spike each, John B. Moore & Son,	3 00
Second, E. Sheppard,	2 00

PETUNIAS.—Collection, filling thirty bottles, one spray in each, Francis B. Hayes,	$8 00
Second, James Nugent,	2 00
Third, Mrs. E. M. Gill,	1 00
CUT FLOWERS.—Display, filling one hundred bottles, Francis B. Hayes,	4 00
Second, Mrs. E. M. Gill,	3 00
Third, W. K. Wood,	2 00
NATIVE FLOWERS.—Collection, Mrs. A. J. Dolbear,	3 00
Second, E. H. Hitchings,	2 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston,	2 00
Gratuities:—	
Francis B. Hayes, Roses, Asters, etc.,	2 00
E. Sheppard, Phlox, Hollyhocks, and Petunias,	2 00
Joseph G. Coolidge, Petunias,	1 00
Mrs. L. P. Weston, Cut Flowers,	2 00
Mrs. E. S. Joyce, " "	1 00
Miss S. W. Story, " "	1 00
Mrs. H. D. Wilmarth, *Sabbatia chloroides*,	1 00

AUGUST 18.

GLADIOLI.—Twenty named varieties, in spikes, Mrs. T. L. Nelson,	8 00
Second, O. B. Hadwen,	6 00
Ten named varieties, in spikes, F. Bacheller,	4 00
Six named varieties, in spikes, F. Bacheller,	3 00
Second, Mrs. T. L. Nelson,	2 00
Single spike, named, O. B. Hadwen, for Baroness Burdett-Coutts,	1 00
Display of named and unnamed varieties, filling one hundred bottles, James Cartwright,	6 00
CUT FLOWERS.—Collection, of not less than twenty-five named species of Annuals, Mrs. E. M. Gill,	3 00
PHLOX DRUMMONDI.—Fifty bottles, not less than six varieties, Mrs. T. L. Nelson,	2 00
Second, James Nugent,	1 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston,	2 00
Gratuities:—	
C. L. Allen & Co., Queens, N. Y., Seedling Gladioli,	2 00
James F. C. Hyde, Hyde's White Gladiolus,	1 00
Francis B. Hayes, Roses, Dahlias, etc.,	3 00
Edwin Fewkes, Roses, etc.,	2 00
Warren Heustis, Hybrid Perpetual Roses,	1 00
E. Sheppard, Dahlias,	1 00
Daniel Duffley, Helianthus,	1 00
John C. Hovey, *Clematis Davidsoni*,	1 00
Mrs. L. P. Weston, Cut Flowers,	2 00

Mrs. E. M. Gill, Cut Flowers, ... $1 00
Miss S. W. Story, " " 1 00
W. K. Wood, Display of " 1 00
John Parker, " " " 1 00

AUGUST 25.

ASTERS.—Large Flowered, thirty blooms, not less than ten varieties, E. Sheppard, ... 4 00
Second, Francis B. Hayes, ... 3 00
Third, M. B. Faxon, ... 2 00
Victoria, or Rose Flowered, thirty blooms, not less than eight varieties, John L. Gardner, ... 4 00
Second, James Nugent, ... 3 00
Third, Mrs. E. M. Gill, ... 2 00
Pompons, thirty sprays, not less than six varieties, one spray in each bottle, Francis B. Hayes, ... 3 00
BASKET OF FLOWERS.—Best arranged, Mrs. E. S. Joyce, . . 2 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston, . . . 2 00

Gratuities:—

Mrs. E. M. Gill, Asters and Gladioli, ... 2 00
Mrs. L. P. Weston, Asters, ... 1 00
E. Sheppard, " 1 00
Francis B. Hayes, Cut Flowers, ... 3 00
Mrs. L. P. Weston, " " 2 00
Miss S. W. Story, " " 1 00
John Parker, " " 1 00

SEPTEMBER 1.

TROPÆOLUMS.—Display, filling twenty-five bottles, the second prize to Adin A. Hixon, ... 2 00
MARIGOLDS.—Display, filling twenty-five bottles, three flowers in each, Adin A. Hixon, ... 3 00
Second, Mrs. E. M. Gill, ... 2 00
Third, Francis B. Hayes, ... 1 00
CUT FLOWERS.—Display, filling one hundred bottles, Francis B. Hayes, ... 4 00
Second, Mrs. E. M. Gill, ... 3 00
Third, Mrs. L. P. Weston, ... 2 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston, . . 2 00

Gratuities:—

E. Sheppard, Dahlias, Petunias, and Phloxes, ... 2 00
Francis B. Hayes, Dahlias and Hydrangeas, ... 1 00
Adin A. Hixon, Asters and Petunias, ... 1 00
Joseph Comley, Seedling Pelargoniums, ... 1 00
Miss Sarah W. Story, Cut Flowers, ... 1 00

John Parker, Cut Flowers, ... $1 00
E. H. Hitchings, Native Flowers, ... 2 00
Mrs. P. D. Richards, twelve species of Golden Rod, ... 1 00

SEPTEMBER 8.

HYBRID PERPETUAL ROSES.—Twelve blooms, of twelve named varieties, in vases, John B. Moore & Son, ... 3 00
DOUBLE ZINNIAS.—Twenty-five flowers, not less than six varieties, Mrs. William Latham, ... 3 00
Second, Hovey & Co., ... 2 00
Third, H. B. Watts, ... 1 00
DIANTHUS, Annual and Biennial varieties.—Fifty bottles, single trusses, E. Sheppard, ... 3 00
Second, Mrs. Austin W. Ward, ... 2 00
Third, H. B. Watts, ... 1 00
HERBACEOUS PLANTS.—Collection, Mrs. L. P. Weston, ... 2 00

Gratuities:—

Francis B. Hayes, Roses and Dahlias, ... 2 00
Mrs. Austin W. Ward, Dianthus and Sweet Peas, ... 1 00
Adin A. Hixon, Pelargoniums, ... 1 00
Mrs. L. P. Weston, Cut Flowers, ... 1 00
" " " Asters, ... 2 00
Mrs. E. M. Gill, " 1 00
Miss S. W. Story, " 1 00

ANNUAL EXHIBITION.

SEPTEMBER 18, 19, 20, AND 21.

Hunnewell Premiums.

EVERGREEN TREES AND SHRUBS.—Display in pots, of other than Native Evergreens of New England, William C. Strong, . $8 00
Second, Hovey & Co., ... 6 00

Special Prize, offered by Samuel Smith, of Newport, R. I.

SINGLE DAHLIAS.—Twenty-five bottles, one spray each, not less than twelve varieties, Edwin Sheppard, a Piece of Plate of the value of 12 00

Society's Prizes.

GREENHOUSE PLANTS.—Twelve Greenhouse and Stove Plants, of different varieties, one Dracæna and one Croton admissible, F. L. Ames, ... 30 00
Second, Samuel R. Payson, ... 25 00
Third, Hovey & Co., ... 20 00

SPECIMEN FLOWERING PLANTS.—Six named varieties in bloom, Francis B. Hayes, ... $10 00
Second, John L. Gardner, ... 8 00
Single named specimen, F. L. Ames, for *Dipladenia Boliviensis*, 5 00
Second, F. L. Ames, for *Epidendrum prismatocarpum*, . . 3 00
VARIEGATED LEAVED PLANTS.—Six named varieties, not offered in a collection of Greenhouse Plants; Crotons and Dracænas not admissible, Hovey & Co., ... 12 00
Single specimen, named, not offered in any collection, John L. Gardner, for *Eurya latifolia var.*, ... 5 00
CALADIUMS.—Six named varieties, Waldo Adams, ... 5 00
Second, Waldo Adams, ... 4 00
FERNS.—Six named varieties, no Adiantums admissible, F. L. Ames, 6 00
Second, Hovey & Co., ... 4 00
ADIANTUMS.—Six named varieties, F. L. Ames, ... 5 00
TREE FERN.—Single specimen, named, Hovey & Co., for *Alsophila australis*, ... 6 00
DRACÆNAS.—Six named varieties, Samuel R. Payson, . . . 6 00
Second, Hovey & Co., ... 5 00
CROTONS.—Six named varieties, in not exceeding six-inch pots, F. L. Ames, ... 4 00
Second, Samuel R. Payson, ... 3 00
PALM.—Single specimen, named, Hovey & Co., for *Pritchardia Pacifica*, ... 5 00
Second, F. L. Ames, for *Phenicophorum Sechellarum*, . . 4 00
NEPENTHES.—Three plants, F. L. Ames, ... 5 00
AGAVES.—Six distinct named varieties, Hovey & Co., . . . 5 00
Second, Francis B. Hayes, ... 4 00
CACTI.—Twelve named species and varieties, Hovey & Co., . . 5 00
SUCCULENTS. — Collection (other than Agaves, Yuccas, or Cacti) of twelve named species and varieties, Hovey & Co., . . . 5 00
BEGONIAS. — Tuberous Rooted, six seedling varieties, the second prize to Hovey & Co., ... 3 00
GLADIOLI.—Best display and best kept, filling one hundred bottles, E. Sheppard, ... 10 00
DAHLIAS.—Twelve named varieties, John L. Gardner, . . . 5 00
Second, Francis B. Hayes, ... 4 00
Third, John Parker, ... 3 00
Six named varieties, Charles W. Hoitt, Nashua, N. H., . . 3 00
Second, James Willey, ... 2 00
Single named flower, John L. Gardner, ... 2 00
Second, Charles W. Hoitt, ... 1 00
LILIPUTIAN DAHLIAS.—General display, James Willey, . . . 3 00
CUT FLOWERS.—Best display, and best kept during the exhibition, filling one hundred and fifty bottles, Mrs. E. M. Gill, . . 16 00
Second, Mrs. L. P. Weston, ... 14 00
Third, Francis B. Hayes, ... 12 00

BASKET OF FLOWERS.—Best arranged, and best kept through the exhibition, Mrs. E. S. Joyce, ... $5 00

TABLE DESIGN.—Best, and best kept through the exhibition, Miss S. W. Story, ... 5 00

Gratuities:—

Francis B. Hayes, Plants,	5 00
Hovey & Co., "	5 00
Samuel R. Payson, Ferns and Crotons,	3 00
John B. Moore & Son, Hybrid Perpetual Roses,	3 00
E. L. Beard, Tuberous Rooted Begonias,	2 00
P. G. Hanson, Celosias,	1 00
W. C. Strong, Foliage of Trees and Shrubs,	2 00
John L. Gardner, Seedling Gloxinias,	2 00
William H. Spooner, Double Stocks,	2 00
A. A. Hixon, Petunias,	1 00
J. W. Manning, Helianthus, fl. pl.,	1 00
E. & C. Woodman, New Coleus Progress,	1 00
John Parker, Dahlias,	2 00
E. Sheppard, "	1 00
E. D. Sturtevant, *Nelumbium speciosum*,	5 00
" " *Victoria regia*,	5 00
" " Nymphæas, in variety,	15 00
Hovey & Co., Flowers of Nymphæas,	2 00
Benjamin Gray, "	1 00
F. L. Ames, Cut Flowers,	3 00
A. A. Hixon, " "	2 00
Miss E. H. Craft, " "	2 00
Mrs. P. D. Richards, Native Flowers,	2 00
E. H. Hitchings, " "	2 00
Carrie S. Leeds, " "	1 00
Frank H. Forbes, Bouquet of Native Flowers,	1 00
Mrs. G. R. Peckham, " " " "	1 00
Annie M. Tilley, Design of Dried Flowers,	1 00

OCTOBER 6.

Gratuity:—

John L. Gardner, Dahlias,	3 00

OCTOBER 20.

Gratuities:—

John L. Gardner, *Erica hyemalis*,	2 00
" " " *Dendrobium chrysanthum*,	2 00
Hovey & Co., Nymphæas,	1 00

CHRYSANTHEMUM SHOW.

NOVEMBER 8 AND 9.

CHRYSANTHEMUMS.—Six Large Flowered, or Chinese, H. P. Walcott,	$8 00
Second, E. W. Wood,	6 00
Six Japanese, H. P. Walcott,	8 00
Second, E. W. Wood,	6 00
Four Pompons, H. P. Walcott,	4 00
Second, E. W. Wood,	3 00
Specimen Plant, Large Flowered, or Chinese, H. P. Walcott,	4 00
Second, E. W. Wood,	3 00
Specimen Plant, Japanese, H. P. Walcott,	4 00
Second, E. W. Wood,	3 00
Specimen Plant, Pompon, E. W. Wood,	3 00
Second, H. P. Walcott,	2 00
Display of named plants, in pots, all classes, not less than ten varieties, H. P. Walcott,	15 00
Second, E. W. Wood,	12 00
Third, Norton Brothers,	8 00
Twelve cut blooms, Large Flowered, or Chinese, Edwin Fewkes,	4 00
Second, H. P. Walcott,	3 00
Third, State Lunatic Hospital, Worcester,	2 00
Six cut blooms, Large Flowered, or Chinese, Edwin Fewkes,	3 00
Second, H. P. Walcott,	2 00
Third, E. W. Wood,	1 00
Display of thirty distinct named varieties of Pompons and Japanese, cut blooms, H. P. Walcott,	6 00
Second, Edwin Fewkes,	5 00
Third, E. W. Wood,	4 00
Fourth, State Lunatic Hospital, Worcester,	3 00
ORCHIDS.—Three varieties, in bloom, F. L. Ames,	8 00
Second, E. W. Gilmore,	6 00
Single Plant, in bloom, F. L. Ames,	4 00
Second, E. W. Gilmore,	3 00

Gratuities:—

John L. Gardner, Chrysanthemum Plants,	8 00
Marshall P. Wilder, " "	6 00
Hovey & Co., " "	6 00
Mrs. E. M. Gill, Cut Chrysanthemums,	3 00
Edwin Fewkes, " "	2 00
Mrs. L. P. Weston, "	2 00
V. H. Hallock, Son & Thorpe, Queens, N. Y., Cut Chrysanthemums,	1 00
E. Sheppard, Chrysanthemums and Pelargoniums,	2 00
Francis B. Hayes, Epacris Plants,	2 00

T. W. Dee, *Fittonia argyrea*, ... $2 00
F. L. Ames, *Anthurium Andreanum* and Cut Flowers, . . . 5 00
Francis B. Hayes, Cut Flowers, ... 2 00
Miss S. W. Story, Cut Flowers, ... 1 00

NOVEMBER 24.

Gratuity:—

George W. Saunders, Pansies, ... 1 00

DECEMBER 1.

Gratuity:—

John L. Gardner, *Cypripedium insigne*, ... 2 00

SILVER MEDALS.

February 17. Francis B. Hayes, Camellias and *Clianthus Dampieri*.
" 24. John L. Gardner, Double Flowered Blackberry.
Azalea and Rose Show, March 22. E. M. Wood & Co., *Lilium longiflorum eximium Harrisii*.
" " " " " " Woolson & Co., Narcissus in variety.
" " " " " " Edward L. Beard, Fancy Pansies.
March 31. F. L. Ames, Orchid Flowers.
May 29. David Allan, Gardener to R. M. Pratt, *Dendrobium thyrsiflorum*.
June 9. Hovey & Co., Cereus No. 2, C. M. Hovey.
Rose and Strawberry Show, June 26. Ellwanger & Barry, Rochester, N. Y., Collection of Hardy Roses.
" " " " " " John B. Moore & Son, Seedling Gloxinias.
July 14. Henry P. Walcott, Seedling Delphiniums.
Annual Exhibition, September 18-21. Hovey & Co., *Ficus elastica aurea*.
" " " " F. L. Ames, *Nepenthes Mastersiana*.
" " " " " " *Aralia Chabrieri*.
" " " " H. H. Hunnewell, *Cattleya aurea*.
" " " " " " Collection of Orchids.
" " " " " " Collection of Crotons and Dracænas.
" " " " " " *Osmanthus ilicifolius var.*
" " " " David Allan, Gardener to R. M. Pratt, *Polypodium plumosum*.
" " " " David Allan, Gardener to R. M. Pratt, Collection of Crotons.
" " " " David Allan, Gardener to R. M. Pratt, Collection of Ferns and Lycopods.
" " " " Edmund D. Sturtevant, Bordentown, N. J., *Nymphæa Zanzibarensis*.
Chrysanthemum Show, November 8 and 9. E. W. Wood, Seedling Chrysanthemums.

Chrysanthemum Show, November 8 and 9. Henry P. Walcott, Seedling Chrysanthemums.

" " " " Henry P. Walcott, Seedling Chrysanthemum, Pontiac.

" " " " F. L. Ames, Orchids.

" " " " David Allan, Gardener to R. M. Pratt, Cut Flowers.

" " " " David Allan, Gardener to R. M. Pratt, *Ouviranda fenestralis.*

December 1. Mrs. L. P. Weston, Exhibits of Herbaceous Plants.

FIRST-CLASS CERTIFICATES OF MERIT.

January 20. W. C. Page, Seedling Carnation Victor.

March 10. Sewall Fisher, " " Anna Webb.

Azalea and Rose Show, March 22. Henry R. Comley, Seedling Carnation No. 1.

" " " " June 13. Hovey & Co., *Lilium Takasango.*

Rose and Strawberry Show. June 26. John C. Hovey, Herbaceous Pæony No. 8, Grandiflora.

" " " " August 11. William H. Spooner, Seedling Gladiolus No. 501.

" " " " " 18. C. L. Allen & Co., Queens, N. Y., Gladioli Martha Washington, Emma Thursby, and Bayard Taylor.

" " " " " 18. John C. Hovey, *Montbretia crocosmæflora.*

" " " " " 25. John C. Hovey, *Amaryllis Hallii.*

Chrysanthemum Show, November 8 and 9. Henry P. Walcott, Seedling Chrysanthemums.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1883.

By E. W. WOOD, CHAIRMAN.

With the exception of Apples and Peaches, the fruit crop, the past season, has been above the average, both in quantity and quality. Considering that it was the non-fruiting year with our apple orchards, the exhibits have been remarkably good; and this was especially noticeable with the Baldwins, which were shown at the Annual and later exhibitions in extent and quality comparing favorably with fruitful years.

The heavy body of ice remaining upon the ground almost through the entire winter injured the strawberry vines in many places, but the favorable weather after the spring opened, produced an unusually heavy crop where the vines escaped injury. The later fruits suffered from the severe drought which prevailed throughout the State, there being no rainfall after the first of July, sufficient to reach the roots of pear trees, until late in October, and the late varieties of pears, except in favorable locations, or where the vigor of the trees was sustained by irrigation, were not up to the average in size, though good in quality.

The past season has been remarkably favorable for the grape in open culture; there has been very little mildew, and the grape suffers less from long-continued heat and drought than any other fruit—in fact it requires this condition of the atmosphere to give it its highest quality.

The prizes offered for late Apples and Pears, March 22, were all awarded.

STRAWBERRIES. — The show at the special exhibition of this fruit, June 26, compared favorably with those of previous years. The Committee have tried, by offering premiums covering a wide range of varieties, to increase the exhibition of this fruit, and at the same time to show the merits of the different varieties by comparison. No fruit shows so much change in the varieties offered from year to year, as the strawberry. Some of the best known and most popular kinds of a few years since, have not appeared upon our tables the past year. But a single dish each of the Triomphe de Gand, Hovey, and Jucunda, was shown; and of the large number of new varieties that have appeared within the past few years, but a small part seem to have established themselves so as to prove that they have come to stay; perhaps among these may be named the Sharpless, Charles Downing, and Hervey Davis.

The first prize for the best four quarts shown was again awarded for the Sharpless. The Special Prize of ten dollars offered by Hon. Marshall P. Wilder, for the best four quarts of the variety of finest form, color, and quality, was awarded to a new seedling grown by Warren Heustis, which he has named Belmont. This seems to be a promising new variety; in color and quality it resembles the Sharpless, but is much better in form.

CHERRIES. — Owing to unfavorable weather at the time of ripening, the exhibits of this fruit were not as good as usual; of the fourteen prizes offered, but nine were awarded.

CURRANTS were well represented in their season, the Versaillaise being the principal red variety shown, and the Transparent and Dana's Transparent the principal white kinds; the former taking the prize when shown in competition with the latter. This fruit is easily grown, reliable for a crop, and meets with ready sale.

RASPBERRIES were shown in more than the usual quantity. A new variety shown by C. M. Atkinson, gardener to John L. Gardner, called McLaren's Prolific, attracted special notice; the berries were of good size and color, the quality good, and the plants are said to be of vigorous growth and productive.

BLACKBERRIES.—The prizes offered for this fruit were all awarded, but the amount shown was limited. We are still waiting for a hardy variety, equal in size and quality to the Dorchester, which would very quickly increase the production of this desirable fruit.

Gooseberries.—There are comparatively but few growers of this fruit, and the competition was limited. There being little demand for gooseberries for market, their cultivation is confined almost entirely to amateurs.

Plums were again shown in liberal quantity, several growers after competing in all the classes for which prizes were offered, placing eight or ten varieties on the table for exhibition. It is evident that the growers have found some means to prevent the ravages of the curculio, which threatened not many years since to exterminate the plum from our list of fruits.

Peaches have not met the expectation which the apparent good condition of the trees in the spring promised. The competition has been limited, and while a part of the fruit shown was of good size and quality, a larger portion than usual showed that the trees from which it was picked were affected by that fatal disease, the yellows; but the peach tree is so easily and quickly grown and so profitable when productive, that the demand for trees is increasing every year.

Grapes.—Of the forty-two prizes offered for Native Grapes during the year, forty were awarded, and among the varieties most generally grown the competition was strong, and the fruit of superior quality. The prizes of seventy-five and twenty-five dollars for Pocklington grapes at the Annual Exhibition were taken by John Charlton, of Rochester, N. Y., and Joseph S. Chase, of Malden. John B. Moore & Son made a display of their seedling, Francis B. Hayes. It seemed perfectly ripe, and in quality was unquestionably the best white grape on exhibition. John Pocklington showed two new white grapes, Nos. 1 and 2, and claimed that they were to be classed among the early varieties. As the specimens shown did not appear to be fully ripe, he stated that the season with him had not been favorable, having been unusually wet, and they had not ripened as early as usual. George A. Stone showed the Empire State, a white grape not ripe enough to judge accurately of its quality. A. J. Bigelow showed, October 6, eight bunches of Concords the average weight being twenty-one and five-eighths ounces, the three heaviest bunches averaging twenty-two and one-half ounces. The bunches were well formed, and the berries large, even, and well ripened.

Foreign Grapes.—The show of this fruit was much larger than for many years. August 25, John S. Farlow showed ten varieties,

and at the Annual Exhibition, besides competing in every class, he placed fifteen varieties upon the table for exhibition. The bunches were large and well formed, but not quite large enough to take either of the two special prizes offered for the last five years but never awarded.

PEARS.—Of the one hundred and forty-one prizes offered for pears, one hundred and thirty-eight were awarded. While the crop has not been as abundant as in some previous years, the specimens shown have been uniformly of good quality and above the average in size. No new pears of special merit have been brought to the notice of the Committee. Several dishes of the Keiffer have been shown, and although of good size, form, and color, its quality must place it among the cooking rather than the dessert pears.

APPLES.—Of the one hundred and eight prizes offered, seventy-three have been awarded, a much larger number than usual on the off or non-fruiting year. Even a slight tendency to a more even distribution, in succeeding years, of this fruit, so desirable for domestic uses, is a fact to be noted and an encouragement to further efforts in this direction.

The only new fruit entered for a Prospective Prize was the Seedling Strawberry, Banquet, by J. R. Hawkins, Mountainville, Orange County, N. Y.

The Committee have awarded in prizes and gratuities eight hundred and fifty dollars, leaving an unexpended balance of just one hundred dollars; this balance is largely from the unawarded prizes for apples and peaches.

The summing up for the year is encouraging for the growers of fruit. Fruit has suffered less than any other crop from the long continued dry weather. There has been a ready sale for all kinds at good prices; there have been no severe storms that have seriously injured fruit, and the weather has been favorable for gathering and marketing. The three most serious obstacles to fruit-growing in this State are the pear blight; the yellows among peach trees, and the codling moth. Any one who can, from study or experience, render any aid in overcoming these enemies of fruit-growers, will confer a favor not only upon cultivators, but upon every lover of fruit.

We would again acknowledge our obligation to the Pomological Society, whose action upon the recommendation of its President

we hope will soon result in eliminating from our schedules, prize cards, and reports, the senseless prefixes to the names of many of our fruits.

E. W. Wood,
P. B. Hovey,
Benjamin G. Smith,
Warren Fenno,
Jacob W. Manning,
Charles F. Curtis,
} *Committee.*

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

MARCH 22.

WINTER APPLES.—Any variety, C. Terry, Northern Spy, . . $3 00
Second, John B. Moore & Son, " " . . 2 00
WINTER PEARS.—Any variety, Warren Fenno, Josephine of Malines, 3 00
Second, B. G. Smith, Duchess of Bordeaux, ... 2 00

Gratuities:—

A. S. McIntosh, Collection of Apples and Pears, ... 2 00
Robert Manning, Lady Apples, ... 1 00
Edward Sumner, Lemons, ... 1 00

MARCH 31.

Gratuity:—

J. W. Talbot, Apples and Pears, ... 1 00

APRIL 14.

Gratuities:—

C. E. Grant, Apples and Pears, ... 1 00
Francis B. Hayes, Strawberries, ... 2 00

APRIL 21.

Gratuity:—

William H. Hunt, Hunt Apples, ... 1 00

JUNE 9.

Gratuity:—

C. E. Grant, Apples and Pears, ... 1 00

JUNE 16.

Gratuity:

William Doran & Son, Strawberries, ... 1 00

ROSE AND STRAWBERRY SHOW.

JUNE 26.

Special Prize offered by Hon. Marshall P. Wilder.

STRAWBERRIES.—For the best four quarts of the variety of finest form, color, and quality, Warren Heustis, Belmont, . . $10 00

Special Prizes offered by the Society.

STRAWBERRIES.—For the best four quarts of any variety, Warren Heustis, Sharpless, Silver Cup, value, ... 20 00

Second, Joseph D. Fitts, Providence, R. I., Jersey Queen, . $10 00
Third, James H. Kimball, Providence, R. I., Manchester,
Harris's Treatise on Insects. . . . . .

Regular Prizes.

STRAWBERRIES.—Four quarts of Downing, William Doran & Son, 3 00
Second, E. W. Wood, ... 2 00
Miner's Prolific, L. W. Weston, ... 3 00
Seth Boyden, E. W. Wood, ... 3 00
Sharpless, E. W. Wood, ... 3 00
Wilder, Joseph Burnett, ... 3 00
Second, Marshall P. Wilder, , ... 2 00
Two quarts of Bidwell, James H. Kimball, ... 2 00
Second, Marshall P. Wilder, ... 1 00
Brighton Pine, Warren Fenno, ... 2 00
Champion, Joseph D. Fitts, ... 2 00
Charles Downing, Warren Fenno, ... 2 00
Second, E. W. Wood, ... 1 00
Col. Cheney, Joseph D. Fitts, ... 2 00
Second, William Doran & Son, ... 1 00
Cumberland Triumph, Marshall P. Wilder, ... 2 00
Hervey Davis, Marshall P. Wilder, ... 2 00
Jersey Queen, Joseph D. Fitts, ... 2 00
Second, James H. Kimball, ... 1 00
Jucunda, C. E. Grant, ... 2 00
Manchester, Joseph D. Fitts, ... 2 00
Second, Marshall P. Wilder, ... 1 00
Miner's Prolific, Joseph D. Fitts, ... 2 00
Monarch, Joseph D. Fitts, ... 2 00
Second, C. E. Grant, ... 1 00
Seth Boyden, E. W. Wood, ... 2 00
Second, Marshall P. Wilder, ... 1 00
Sharpless, George V. Fletcher, ... 2 00
Second, Warren Heustis, ... 1 00
Any other variety, Warren Heustis, Belmont, ... 2 00
Second, Joseph D. Fitts, Gypsy, ... 1 00
Collection of not less that six varieties, one quart of each, Joseph
D. Fitts, ... 4 00
One quart of any new variety, not previously exhibited, J. R.
Hawkins, Mountainville, N. Y., Banquet, ... 3 00
Second, Joseph D. Fitts, Seneca Queen, ... 2 00
Fifty berries of any variety, Warren Heustis, ... 2 00
CHERRIES.—Two quarts of any variety, I. P. Langworthy, . . . 2 00
Second, C. E. Grant, ... 1 00
FOREIGN GRAPES.—Two bunches of any variety, Francis B. Hayes,
Victoria Hamburg, ... 3 00
Second, Francis B. Hayes, Black Hamburg, ... 2 00
Third, E. Sheppard, " " 1 00

Gratuities:

C. E. Grant, Cherries, Strawberries, and Apples,	$2 00
A. D. Capen, Cherries and Strawberries,	1 00
Marshall P. Wilder, Strawberries,	1 00
J. R. Hawkins, Raspberries,	1 00

JULY 7.

STRAWBERRIES.—Two quarts of any variety, Warren Heustis, Belmont,	2 00
CHERRIES.—Two quarts of Black Eagle, C. E. Grant,	2 00
Two quarts of Black Tartarian, " "	2 00
Two quarts of Downer, " "	2 00
Second, Samuel Lockwood,	1 00
Two quarts of any other variety, C. E. Grant, Napoleon,	2 00
Second, Horace Partridge, May Duke,	1 00

Gratuity:—

B. G. Smith, Raspberries and Currants,	2 00

JULY 14.

CHERRIES.—Two quarts of any variety, Warren Fenno, Downer,	2 00
RASPBERRIES.—Two quarts of any variety, C. E. Grant, Cuthbert,	2 00
Second, William Doran & Son, Franconia,	1 00
CURRANTS.—Four quarts of any Red variety, B. G. Smith, Versaillaise,	3 00
Second, E. W. Wood, Versaillaise,	2 00
Third, William Doran & Son, "	1 00
Two quarts of any White variety, B. G. Smith, Transparent,	3 00
Second, B. G. Smith, Dana's Transparent,	2 00

Gratuities:—

C. E. Grant, Raspberries and Currants,	1 00
John L. Gardner, McLaren's Prolific Raspberries,	1 00
A. D. Capen, Raspberries,	1 00
M. W. Chadbourne, Currants and Gooseberries,	1 00
B. G. Smith, June-Berries,	1 00

JULY 21.

RASPBERRIES.—Not less than four varieties, two quarts of each, William Doran & Son,	4 00
Second, B. G. Smith,	3 00
Two quarts of any variety, William Doran & Son, Franconia,	2 00
Second, A. D. Capen, Franconia,	1 00
BLACKCAPS.—Two quarts of any variety, C. E. Grant, Mammoth,	2 00
CURRANTS.—Two quarts of Dana's Transparent, B. G. Smith,	2 00
Second, C. E. Grant,	1 00
Two quarts of Versaillaise, Lemuel Clapp,	2 00
Second, B. G. Smith,	1 00

Two quarts of any other variety, B. G. Smith, Transparent,	$2 00
Second, William Doran & Son, Cherry,	1 00
BLACKBERRIES. — Two quarts of any variety, A. S. McIntosh, Dorchester,	2 00

JULY 28.

CURRANTS. — Two quarts of any Red variety, B. G. Smith, Versaillaise,	2 00
Second, Mrs. E. M. Gill, Versaillaise,	1 00
Two quarts of any White variety, M. W. Chadbourne, Transparent,	2 00
Second, B. G. Smith, Transparent,	1 00
BLACKBERRIES. — Two quarts of any variety, A. S. McIntosh, Dorchester,	2 00
Second, James Nugent, Dorchester,	1 00
GOOSEBERRIES. — Two quarts of any Native variety, B. G. Smith, Smith's Seedling,	2 00
Second, Warren Fenno, Downing,	1 00
Gratuity: —	
Francis B. Hayes, Foreign Grapes,	3 00

AUGUST 4.

BLACKBERRIES. — Two quarts of any variety, James Nugent, Dorchester,	2 00
Second, A. S. McIntosh, Dorchester,	1 00
GOOSEBERRIES. — Two quarts of any Foreign variety, B. G. Smith, Whitesmith,	2 00
Second, B. G. Smith, Bang-Up,	1 00
PEARS. — Summer Doyenne, E. W. Wood,	2 00
Second, Peveril Meigs,	1 00
Any other variety, Horace Eaton, André Desportes,	2 00
Second, Hovey & Co., Quimper,	1 00
APRICOTS. — Any variety, Moses Darling, Jr.,	2 00
Gratuity: —	
Samuel Hartwell, Peaches and Apples,	1 00

AUGUST 11.

APPLES. — Sweet Bough, Warren Fenno,	2 00
Any other variety, Lemuel Clapp, Williams,	2 00
Second, Samuel Hartwell, Williams,	1 00
PEARS. — Beurre Giffard, Warren Fenno,	2 00
Second, Mrs. Mary Langmaid,	1 00
Any other variety, Robert Manning, Bloodgood,	2 00
Second, George Frost, Quimper,	1 00
Gratuity: —	
Samuel Hartwell, Apples, Pears, and Peaches,	1 00

AUGUST 18.

APPLES. — Red Astrachan, J. T. Foster,	$2 00
Second, C. C. Shaw,	1 00
Williams, Joseph Coolidge,	2 00
Second, Samuel Hartwell,	1 00
PEARS. — Clapp's Favorite, Horace Eaton,	2 00
Second, Warren Fenno,	1 00
Elizabeth, Mrs. Mary Langmaid,	2 00
Second, Warren Fenno,	1 00
Any other variety, C. N. Brackett, Brandywine,	2 00
Second, Hovey & Co., "	1 00
FIGS. — Any variety, Francis B. Hayes,	2 00

Gratuities: —

Horace Partridge, Foreign Grapes,	1 00
George Frost, Pears,	1 00
Robert Manning, Pears and Blackberries,	1 00
Samuel Hartwell, Pears, Apples, and Peaches,	2 00
Mrs. Benjamin Fobes, Figs,	1 00
Warren Fenno, Pears,	1 00
M. W. Chadbourne, Pears,	1 00

AUGUST 25.

PEARS. — Bartlett, Mrs. Mary Langmaid,	2 00
Second, Charles L. Fowle,	1 00
Rostiezer, M. W. Chadbourne,	2 00
Second, Horace Eaton,	1 00
Tyson, A. S. McIntosh,	2 00
Second, Samuel McIntosh,	1 00
Any other variety, Warren Fenno, Ananas d' été,	2 00
Second, Horace Eaton, Petite Marguerite,	1 00

Gratuities:—

Samuel Hartwell, Pears, Apples, and Plums,	2 00
John S. Farlow, ten varieties of Foreign Grapes, Silver Medal.	

SEPTEMBER 1.

APPLES.—Any variety, Samuel Hartwell, Gravenstein,	2 00
Second, " " Holden,	1 00
PEARS.—Bartlett, Mrs. Mary Langmaid,	2 00
Second, T. M. Davis,	1 00
Any other variety, Horace Partridge, Belle Lucrative,	2 00
Second, C. E. Grant, Flemish Beauty,	1 00
PEACHES.—Any variety, Samuel Hartwell, Crawford's Early,	3 00
PLUMS.—Any variety, Horace Eaton, Washington,	2 00
Second, John B. Moore & Son, Sharp's Emperor,	1 00

NATIVE GRAPES.—Six bunches of any variety, John B. Moore & Son, Moore's Early, ... $2 00
Second, J. W. Talbot, Cottage, ... 1 00

Gratuities:—

C. E. Grant, Grapes and Pears, ... 1 00
Horace Eaton, Plums, ... 1 00
F. J. Dutcher, " 1 00
Samuel Hartwell, " and Apples, ... 1 00
B. G. Smith, Grapes, ... 1 00

SEPTEMBER 8.

APPLES.—Gravenstein, Francis Smith, ... 2 00
Second, Samuel Hartwell, ... 1 00
Porter, Samuel Hartwell, ... 2 00
Second, L. W. Weston, ... 1 00
Any other variety, Samuel Hartwell, Holden, ... 2 00
Second, " " Pumpkin Sweet, . . . 1 00
PEARS.—Andrews, Mrs. Mary Langmaid, ... 2 00
Second, Charles F. Curtis, ... 1 00
Boussock, Horace Eaton, ... 2 00
Second, C. N. Brackett, ... 1 00
Any other variety, Hovey & Co., Hanna's, ... 2 00
Second, Warren Fenno, Esperine, ... 1 00
PEACHES.—Collection, Samuel Hartwell, ... 3 00
PLUMS.—Collection, not less than four varieties, Horace Eaton, . 3 00
Second, John B. Moore & Son, ... 2 00
Any one variety, John B. Moore & Son, Yellow Gage, . . . 2 00
Second, F. J. Dutcher, McLaughlin, ... 1 00
NATIVE GRAPES.—Six bunches of Delaware, Cephas H. Brackett, . 2 00
Second, Horace Partridge, ... 1 00
Hartford, Cephas H. Brackett, ... 2 00
Second, T. M. Davis, ... 1 00
Moore's Early, John B. Moore & Son, ... 2 00
Second, Samuel Hartwell, ... 1 00
Any other variety, B. G. Smith, Creveling, ... 2 00
Second, S. G. Damon, Adirondac, ... 1 00

Gratuity:—

C. E. Grant, Peaches, Pears, and Apples, ... 1 00

ANNUAL EXHIBITION.

SEPTEMBER 18, 19, 20, AND 21.

Special Prize offered by George A. Stone, Rochester, N. Y.

NATIVE GRAPES.—Twelve bunches of Pocklington, John Charlton, Rochester, N. Y., ... $75 00
Six bunches, Joseph S. Chase, ... 25 00

Special Prizes offered by the Society.

Twelve Gravenstein Apples, Samuel Hartwell,	$5 00
Twelve Bartlett Pears, Mrs. Mary Langmaid,	5 00
Twelve Peaches of any variety, Samuel Hartwell, Crawford's Early,	5 00
Twelve bunches Native Grapes of any variety, John B. Moore & Son, Moore's Early,	5 00

Regular Prizes.

Apples.—Baldwin, John Cummings,	3 00
Second, Mrs. A. M. Winn,	2 00
Third, C. L. Weston,	1 00
Danvers Sweet, John Cummings,	2 00
Second, C. N. Brackett,	1 00
Dutch Codlin, Lemuel Clapp,	2 00
Holden, Samuel Hartwell,	2 00
Gravenstein, Warren Heustis,	3 00
Second, Samuel Hartwell,	2 00
Third, Lemuel Clapp,	1 00
Hubbardston, L. W. Weston,	3 00
Second, Samuel Hartwell,	2 00
Third, M. W. Chadbourne,	1 00
Hunt, Samuel Hartwell,	2 00
Second, C. N. Brackett,	1 00
Lady's Sweet, Warren Fenno,	2 00
Lyscom, Samuel Hartwell,	2 00
Northern Spy, John B. Turner,	2 00
Second, Samuel Hartwell,	1 00
Porter, Mrs. A. M. Winn,	2 00
Second, Samuel Hartwell,	1 00
Pumpkin, George W. Stevens,	2 00
Second, Lemuel Clapp,	1 00
Rhode Island, John L. D'Wolf,	3 00
Second, C. N. Brackett,	2 00
Third, Samuel Hartwell,	1 00
Roxbury, John L. D'Wolf,	3 00
Second, Mrs. M. T. Goddard,	2 00
Third, C. N. Brackett,	1 00
Tompkins King, Samuel Hartwell,	2 00
Second, Hovey & Co.,	1 00
Tolman Sweet, J. T. Foster,	3 00
Second, Josiah Crosby,	2 00
Third, Lemuel Clapp,	1 00
Washington Royal, Josiah Crosby,	2 00
Washington Strawberry, Lemuel Clapp,	2 00
Second, Warren Fenno,	1 00
Any other variety, Samuel Hartwell, Gloria Mundi,	2 00
Second, Samuel Hartwell, Pound Sweet,	1 00

CRAB APPLES.—Hyslop, Cephas H. Brackett,	$2 00
Second, Mrs. Austin W. Ward,	1 00
Transcendent, Warren Fenno,	2 00
PEARS.—Angouleme, John McClure,	3 00
Second, W. S. Janvrin,	2 00
Third, Warren Fenno,	1 00
Anjou, Mrs. Mary Langmaid,	3 00
Second, W. S. Janvrin,	2 00
Third, C. N. Brackett,	1 00
Bartlett, Mrs. Mary Langmaid,	3 00
Second, N. D. Harrington,	2 00
Third, George S. Harwood,	1 00
Bosc, Mrs. Mary Langmaid,	3 00
Second, Warren Fenno,	2 00
Third, Charles F. Curtis,	1 00
Boussock, George S. Harwood,	2 00
Second, Horace Eaton,	1 00
Clairgeau, W. P. Plimpton,	3 00
Second, Mrs. Mary Langmaid,	2 00
Third, Jesse Haley,	1 00
Comice, Horace Eaton,	2 00
Second, Warren Fenno,	1 00
Dana's Hovey, I. D. White,	3 00
Second, E. W. Wood,	2 00
Third, Hovey & Co.,	1 00
Diel, A. S. McIntosh,	2 00
Second, Walker & Co.,	1 00
Hardy, Mrs. H. P. Kendrick,	2 00
Second, Jesse Haley,	1 00
Goodale, C. E. Grant,	2 00
Second, Marshall P. Wilder,	1 00
Howell, Jesse Haley,	2 00
Second, B. G. Smith,	1 00
Lawrence, Mrs. Mary Langmaid,	2 00
Second, Warren Fenno,	1 00
Louise Bonne of Jersey, George S. Harwood,	2 00
Second, Mrs. Mary Langmaid,	1 00
Lucrative, Mrs. Mary Langmaid,	2 00
Second, Horace Partridge,	1 00
Marie Louise, Warren Fenno,	2 00
Second, Walker & Co.,	1 00
Merriam, Charles F. Curtis,	2 00
Second, Marshall P. Wilder,	1 00
Nelis, Warren Fenno,	2 00
Second, T. M. Davis,	1 00
Onondaga, Marshall P. Wilder,	2 00
Second, Horace Eaton,	1 00

Paradise, William A. Crafts,	$2 00
Second, Hovey & Co.,	1 00
Seckel, George S. Harwood,	3 00
Second, John L. Bird,	2 00
Third, George E. Peters,	1 00
Sheldon, Mrs. H. P. Kendrick,	3 00
Second, George S. Harwood,	2 00
Third, Mrs. Mary Langmaid,	1 00
Souvenir du Congrès, B. G. Smith,	2 00
Second, Marshall P. Wilder,	1 00
St. Michael Archangel, Walker & Co.,	2 00
Second, T. M. Davis,	1 00
Superfin, Warren Fenno,	2 00
Second, E. W. Wood,	1 00
Urbaniste, Mrs. Mary Langmaid,	2 00
Second, John L. Bird,	1 00
Vicar, A. S. McIntosh,	2 00
Second, Warren Fenno,	1 00
Any other variety, Marshall P. Wilder, Clapp's Favorite,	2 00
Second, Augustus Bacon, Flemish Beauty,	1 00
PEACHES.—Crawford's Early, Samuel Hartwell,	2 00
Second, Elijah H. Luke,	1 00
Crawford's Late, Samuel Hartwell,	2 00
Foster, Samuel Hartwell,	2 00
Second, John B. Moore & Son,	1 00
Any other variety, A. W. Felton, Yellow Rareripe,	2 00
Second, Samuel Hartwell, Grosse Mignonne,	1 00
NECTARINES.—Warren Fenno,	2 00
PLUMS.—Collection of not less than four varieties, Samuel Hartwell,	4 00
Second, John B. Moore & Son,	3 00
Any one variety, B. G. Smith, Coe's Golden,	2 00
Second, Samuel Hartwell, Jefferson,	1 00
NATIVE GRAPES.—Six bunches of Brighton, D. A. Wasson,	2 00
Second, John McFarland,	1 00
Concord, John B. Moore & Son,	2 00
Second, Cephas H. Brackett,	1 00
Delaware, Joseph S. Chase,	2 00
Second, John B. Moore & Son,	1 00
Massasoit, John B. Moore & Son,	2 00
Second, Cephas H. Brackett,	1 00
Moore's Early, Horace Eaton,	2 00
Second, John B. Moore & Son,	1 00
Wilder, Joseph S. Chase,	2 00
Second, Cephas H. Brackett,	1 00
Worden, Samuel Hartwell,	2 00
Any other variety, John B. Moore & Son, Iona Seedling,	2 00
Second, Samuel Hartwell, Norwood,	1 00

FOREIGN GRAPES.—Four varieties, two bunches of each, John S. Farlow,	$8 00
Second, Elijah H. Luke,	6 00
Third, Benjamin G. Smith,	4 00
Two bunches of Black Hamburg, George Higginson,	4 00
Second, John S. Farlow,	3 00
Third, C. E. Grant,	2 00
Wilmot's Hamburg, John S. Farlow,	4 00
Second, George Higginson,	3 00
Muscat of Alexandria, John S. Farlow,	5 00
Any other variety, John S. Farlow, Pope's Hamburg,	5 00
Second, George Higginson, White Frontignan,	4 00
CRANBERRIES.—Half-peck, A. M. Tilley,	2 00

Gratuities :—

Francis Smith, Gravenstein Apples,	1 00
Warren Fenno, Pears and Apples,	2 00
W. A. Morse, " "	2 00
L. W. Weston, " "	2 00
C. E. Grant, " "	3 00
Samuel Hartwell, " "	1 00
I. D. White, Pears,	3 00
M. W. Chadbourne, Pears,	2 00
C. N. Brackett, "	2 00
William T. Hall, "	2 00
John Cummings, "	1 00
Augustus Bacon, "	1 00
Horace Partridge, "	1 00
Hovey & Co., "	1 00
Marshall P. Wilder, "	1 00
E. S. Converse, "	1 00
Francis B. Hayes, "	1 00
John S. Farlow, Foreign Grapes,	3 00
B. G. Smith, " "	1 00
Jonathan Mann, Hamburg Grapes,	1 00
William Richardson, Concord Grapes,	1 00
G. W. Jameson, Barberries,	1 00
William Doran & Son, Raspberries,	1 00
O. M. Holmes, Cranberries,	1 00

John B. Moore, Display of the Francis B. Hayes Grape, Silver Medal.

SEPTEMBER 29.

Gratuities :—

N. D. Harrington, Pears,	1 00
D. W. Lothrop, Seedling Pear,	1 00
S. G. Stone, Isabella Grapes,	1 00

OCTOBER 6.

APPLES.—Gravenstein, Francis Smith,	$2 00
Second, Samuel Hartwell,	1 00
Porter, Francis Smith,	2 00
Second, C. W. Grant,	1 00
Any other variety, Lemuel Clapp, Washington Strawberry,	2 00
Second, Samuel Hartwell, Hubbardston,	1 00
PEARS.—Angouleme, Mrs. H. P. Kendrick,	2 00
Second, John McClure,	1 00
Bosc, George S. Harwood,	2 00
Second, Warren Fenno,	1 00
Clairgeau, W. P. Plimpton,	2 00
Second, Mrs. Mary Langmaid,	1 00
Comice, George S. Harwood,	2 00
Second, Warren Fenno,	1 00
Louise Bonne of Jersey, George S. Harwood,	2 00
Second, Mrs. Mary Langmaid,	1 00
Seckel, P. Kenney,	2 00
Second, George S. Harwood,	1 00
Sheldon, Mrs. H. P. Kendrick,	2 00
Second, George S. Harwood,	1 00
Superfin, Warren Fenno,	2 00
Second, Augustus Bacon,	1 00
Urbaniste, John L. Bird,	2 00
Second, Mrs. Mary Langmaid,	1 00
Any other variety, A. S. McIntosh, Diel,	2 00
Second, C. E. Grant, Goodale,	1 00
QUINCES.—Benjamin G. Smith,	2 00
Second, Horace Eaton,	1 00
NATIVE GRAPES.—Six bunches of Brighton, Horace Eaton,	2 00
Second, Joseph S. Chase,	1 00
Concord, John B. Moore & Son,	2 00
Second, Horace Eaton,	1 00
Delaware, E. Snow,	2 00
Second, Joseph S. Chase,	1 00
Iona, John B. Moore & Son,	2 00
Second, B. G. Smith,	1 00
Isabella, J. V. Wellington,	2 00
Second, B. G. Smith,	1 00
Massasoit, Horace Eaton,	2 00
Moore's Early, John B. Moore & Son,	2 00
Second, Horace Eaton,	1 00
Wilder, John B. Moore & Son,	2 00
Second, Horace Eaton,	1 00
Any other variety, John B. Moore & Son, Francis B. Hayes,	2 00
Second, C. E. Grant, Catawba,	1 00

FOREIGN GRAPES.—Two bunches of any variety, John L. Gardner, Black Hamburg, ... $3 00
Second, E. W. Wood, Wilmot's Hamburg, ... 2 00

Gratuities:—

T. L. Perkins, Apples, ... 1 00
C. W. Grant, " 1 00
C. E. Grant, Apples and Pears, ... 1 00
Samuel Hartwell, Apples and Peaches, ... 1 00
Francis Smith, Apples, Pears, and Peaches, ... 1 00
A. S. McIntosh, Pears, ... 2 00
Warren Fenno, Pears, ... 2 00
M. W. Chadbourne, Pears and Grapes, ... 1 00
B. G. Smith, Grapes, ... 1 00
William H. Wilcox, Grapes, ... 1 00
John B. Moore & Son, Peaches, ... 1 00
A. J. Bigelow, Concord Grapes, Silver Medal.

NOVEMBER 8 AND 9.

French Premiums.

APPLES.—Baldwin, John Cummings, ... 2 00
Second, J. T. Foster, ... 1 00
Hubbardston, L. W. Weston, ... 2 00
Second, M. W. Chadbourne, ... 1 00
Hunt, Samuel Hartwell, ... 2 00
Lady's Sweet, Warren Fenno, ... 2 00
Northern Spy, Samuel Hartwell, ... 2 00
Rhode Island, A. S. McIntosh, ... 2 00
Roxbury, Cephas H. Brackett, ... 2 00
Tolman Sweet, J. T. Foster, ... 2 00
Tompkins King, Samuel Hartwell, ... 2 00
Second, John Parker, ... 1 00
PEARS.—Angouleme, Warren Fenno, ... 2 00
Second, John McClure, ... 1 00
Anjou, Mrs. Mary Langmaid, ... 2 00
Second, A. S. McIntosh, ... 1 00
Comice, John C. Park, ... 2 00
Second, Warren Fenno, ... 1 00
Dana's Hovey, Warren Fenno, ... 2 00
Second, Hovey & Co., ... 1 00
Glout Morceau, Augustus Bacon, ... 2 00
Second, A. S. McIntosh, ... 1 00
Josephine of Malines, Warren Fenno, ... 2 00
Langelier, C. E. Grant, ... 2 00
Second, A. S. McIntosh, ... 1 00
Lawrence, Mrs. Mary Langmaid, ... 2 00
Second, John McClure, ... 1 00

Nelis, T. M. Davis,	$2 00
Second, Warren Fenno,	1 00
Vicar, Walker & Co.,	2 00
Second, A. S. McIntosh,	1 00
Any other variety, A. S. McIntosh, Diel,	2 00
Second, Augustus Bacon, Easter Beurre,	1 00

Gratuities: —

C. W. Grant, Apples,	1 00
Samuel Hartwell, Apples,	1 00
Marshall P. Wilder, Pears,	3 00
Warren Fenno, "	2 00
M. W. Chadbourne, "	2 00
C. E. Grant, "	1 00
Mrs. Mary Gardner, "	1 00
Augustus Bacon, "	1 00
A. S. McIntosh, "	1 00
Horace Eaton, Quinces,	1 00

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1883.

By CHARLES N. BRACKETT, CHAIRMAN.

The closing of another exhibition season reminds us of a duty which, by custom and in conformity to our By-Laws, we owe the Society, of rendering to it an account of our labors for the year, together with the amount of awards in prizes and gratuities which have been made.

In reviewing the season, which has in many respects been a most remarkable one, your Committee cannot but feel gratified at the progress made, and the good degree of success which has attended the efforts of contributors under so many disadvantageous circumstances.

The excessive drought and scorching sun of the past summer were not propitious for the production of fine specimens of vegetable growth, and the effect was shown in a marked manner at some of our weekly exhibitions. But, in spite of these discouragements, the displays, on the whole, have been most gratifying, and no lack of interest has been manifested on the part of contributors.

The show of forced vegetables, during the early portion of the season, as has been the case for several years past, was confined to a few contributors. To President Hayes, Josiah Crosby, and Cephas H. Brackett, we have been indebted for the occasional exhibition of choice specimens during the months of February and

March. These gentlemen were the only contributors previous to the opening exhibition, March 22, and continued to show specimens of Rhubarb, Cucumbers, Mushrooms, Lettuce, Radishes, Dandelions, Tomatoes, and Parsley, from week to week all through their season. At the Azalea Show, the exhibition of vegetables grown under glass was much better than last year, all the first and most of the second prizes being awarded.

The general weekly displays during the season, though satisfactory, were not so extensive perhaps as in some former years, which was, no doubt, owing mainly to the long continued drought.

The earliest specimens of Peas were shown by M. W. Chadbourne, June 16. The varieties were Bliss's American Wonder, and Breck's Excelsior. The first and second prizes were both awarded to the American Wonder, a first-class pea, and a great acquisition.

The first and second prizes for potatoes, July 14, were taken with Hebron and Clark. The exhibition of Sweet Corn has not been as abundant or as good as usual, the late varieties having been more or less injured by the dry weather. The first and second prizes were awarded July 21 for Marblehead. No variety equal to it in quality can compete with this corn in earliness, but, on account of its great liability to smut, it is considered unprofitable by many who have grown it largely for market the past two or three seasons. The first prize for Early Crosby corn was taken by Josiah Crosby, July 28.

The first exhibition of Tomatoes, of out-door growth, was made July 14 by George Hill; the variety was the Emery. The specimens were exceedingly fine ones. With many who grow the tomato largely for market, the Emery is rapidly taking the place of the old Boston Market.

July 21 being prize day, the first prize was awarded for Acme. This variety also took first and second prizes at all succeeding shows during the season, in competition with Paragon, Emery, Boston Market, Trophy, and Livingston's Perfection. Livingston's Perfection and Favorite appear to be identical; both are subject to blight, and neither, in our estimation, is any improvement on the Acme or Paragon. After Mr. Livingston introduced the Acme, we think there was very little room left for improvement, either in form or quality. It is also worthy of note that, while a

host of so-called new or improved varieties appear and disappear with every season, this variety has gone on steadily increasing in favor from its first introduction, until it is now almost universally acknowledged to be the best and most valuable of all. The Acme, Paragon, and Emery, we consider the best three of the many varieties before the public. If confined to but one variety, we should choose the Acme.

The season has been favorable for Melons, and they have been shown in great perfection. August 18 the first prize was awarded to George Hill, for Greenflesh, and he again received the same prize September 1. As usual, his specimens were superb, and in the best possible condition, as some of your Committee can testify.

The shows of Celery, Egg Plants, and Cauliflowers were worthy of special mention. Josiah Crosby's splendid specimens of celery at the Annual Exhibition took both the special and first regular prizes. John Cummings did the same with cauliflowers, his specimens of Early Dawn being the best we have ever seen; they attracted the attention of all who entered the Hall. Some remarkably fine specimens of Egg Plant were exhibited during the season by Joseph G. Coolidge and George D. Moore.

At the Annual Exhibition, we have to report the largest and best show of Potatoes ever made by this Society. This crop has, the past season, been more than an average one, both in quality and yield, and was sufficiently advanced when the dry weather set in to escape the drought. There were ninety-five dishes in competition for the fifteen prizes, which, it is hardly necessary to say, were all awarded. The largest contributor was John Cummings, who showed a fine collection of thirty varieties. Aaron Low was next, with a collection of twenty varieties. The first prize for the best four varieties was taken by Mr. Cummings, who also took the first prize for the best dish of Clark, and the first for "any other variety" was awarded him for King. For Rose, Samuel Hartwell was the successful competitor, and John B. Moore was first for Hebron.

It is one of the easiest things in the world to raise new varieties of the potato from seed, but it is not so easy to make advances on the best varieties in cultivation. Experience shows that the most hopeful and promising seedlings at the start, often prove worthless in the course of further experiment, and the time and labor of cultivating many thousand seedlings is required to secure a single

variety in all respects worthy of cultivation. Among the newest of the new in the way of seedling potatoes, at the Annual Exhibition, were the Advance and North Star, from Albert Bresee, of Hubbardton, Vt. For many years Mr. Bresee's name has been made familiar throughout the country as the originator of the Early Rose and other valuable varieties now in general cultivation. Mr. Bresee's seedling, Advance, was first shown here by him at the Annual Exhibition in 1882, and favorably noticed in our report of that year. Those who have grown it in this vicinity the past season all speak of it in terms of unqualified praise. Mr. Bresee says, in regard to these two seedlings, "The Advance and North Star originated in 1874 or 1875, from a seed ball of the Early Rose, fertilized with the Climax by planting them in alternate hills with the Rose. I have never found any seed balls on the Early Rose when planted alone. For many years I have grown seedlings from the Rose in the manner described, and have succeeded in obtaining two or three varieties which I fully believe to be of much value. As to the time of ripening, some seasons the Advance ripens quite as early as the Rose, at others a *very few* days later. Charles Downing writes me, 'the Advance is a little earlier, and of better quality than the Rose.' J. J. H. Gregory writes, 'In yield and size it rather surpasses the Rose, and it is earlier.' The North Star is a very strong grower, large yielder, and of first quality, and should not be planted on very rich or moist land." Mr. Bresee further says: "Some years ago I tried to make some arrangement with a noted dealer in seed potatoes for the sale of these seedlings, but, as I could not make any trade with him without giving him all the profits, I came home and gave them out without making one dollar, so you can see that I have no axe to grind."

From our own experience, having grown a small quantity of the Advance by way of trial, the past season, we are free to say that we think it possesses merits of a high order, and we feel satisfied that, as soon as known, it will take its place among our most popular varieties.

Before closing this report, we would call the attention of contributors to important changes in the Schedule of Prizes for the coming year, and especially to the number, or quantity of specimens, which will be required in future where peas, potatoes, onions, etc., are exhibited.

The amount of $514 has been awarded in prizes and gratuities the past year, leaving an unexpended balance of $16 to be returned to the treasury.

Annexed will be found a list of the awards which have been made by your Committee.

Respectfully submitted,

C. N. BRACKETT, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

FEBRUARY 3.

Gratuity:—

Francis B. Hayes, Rhubarb, ... $1 00

FEBRUARY 10.

Gratuities:—

Josiah Crosby, Celery, ... 2 00
Francis B. Hayes, Rhubarb, ... 1 00

FEBRUARY 17.

Gratuity:—

Cephas H. Brackett, Cucumbers and Rhubarb, ... 3 00

FEBRUARY 24.

Gratuity:—

Josiah Crosby, Lettuce and Radishes, ... 2 00

MARCH 3.

Gratuity:—

Josiah Crosby, Lettuce and Radishes, ... 2 00

MARCH 10.

Gratuity:—

Josiah Crosby, Lettuce, ... 1 00

MARCH 17.

Gratuity:—

Josiah Crosby, Radishes and Lettuce, ... 2 00

AZALEA AND ROSE EXHIBITION.

MARCH 22.

RADISHES.—Four bunches of Turnip Rooted, Josiah Crosby, . . $3 00
Second, George F. Stone, ... 2 00
Long Scarlet, Josiah Crosby, ... 3 00
CUCUMBERS.—Pair, Cephas H. Brackett, ... 3 00
DANDELIONS.—Peck, George F. Stone, ... 2 00

LETTUCE.—Four heads, J. Crosby,	$3 00
Second, George F. Stone,	2 00
PARSLEY.—Two quarts, William Patterson,	2 00

Gratuities :—

C. H. Brackett, Mushrooms and Cucumbers,	2 00
C. M. Atkinson, Parsley,	1 00

MARCH 31.

Gratuity :—

Josiah Crosby, Lettuce,	1 00

APRIL 14.

Gratuity :—

Francis B. Hayes, Cucumbers and Lettuce,	2 00

APRIL 21.

Gratuity :—

C. H. Brackett, Mushrooms and Cucumbers,	2 00

APRIL 28.

Gratuity :—

George W. Pierce, Lettuce,	2 00

MAY 5.

Gratuity :—

Josiah Crosby, Dandelions,	1 00

MAY 12.

Gratuities :—

John B. Moore, Asparagus,	2 00
Samuel Hartwell, "	1 00
Josiah Crosby, Carrots and Radishes,	1 00

MAY 19.

Gratuities :—

C. H. Brackett, Tomatoes and Rhubarb,	2 00
Samuel Hartwell, Asparagus and Rhubarb,	1 00

MAY 26.

Gratuities :—

Josiah Crosby, Collection,	3 00
C. H. Brackett, "	2 00
C. W. Grant, Rhubarb,	1 00

JUNE 2.

Gratuities :—

C. H. Brackett, Tomatoes and Cucumbers,	1 00
M. W. Chadbourne, Rhubarb,	1 00
Marshall P. Wilder, Marquis of Lorne Cucumbers,	1 00

JUNE 9.

CARROTS.—Twelve Short Scarlet, J. Crosby,	$2 00
RADISHES.—Twelve Turnip Rooted, J. Crosby,	2 00
ASPARAGUS.—Four bunches, J. B. Moore,	2 00
Second, L. W. Weston,	1 00
CUCUMBERS.—Pair, C. B. Lancaster,	2 00
LETTUCE.—Four heads, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00
RHUBARB.—Twelve stalks, Samuel Hartwell,	2 00

Gratuities:—

Samuel Hartwell, Asparagus,	1 00
Josiah Crosby, Collection,	2 00
C. H. Brackett, Tomatoes.	1 00

JUNE 13.

Gratuity:—

Josiah Crosby, Cucumbers,	1 00

JUNE 16.

Gratuity:

M. W. Chadbourne, Peas,	2 00

JUNE 23.

Gratuities:—

M. W. Chadbourne, Cucumbers,	1 00
C. B. Lancaster, "	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 26.

Whitcomb Prizes.

BEETS.—Twelve Turnip Rooted, Warren Heustis,	$2 00
Twelve Egyptian, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00
ONIONS.—Twelve, Josiah Crosby,	2 00
CUCUMBERS.—Pair, E. W. Wood,	2 00
Second, Josiah Crosby,	1 00
CABBAGES.—Four, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00
LETTUCE.—Four heads, John L. Gardner,	2 00
PEAS.—Peck, Samuel Hartwell,	2 00
Second, Samuel G. Stone,	1 00

Gratuities:—

C. H. Brackett, Tomatoes,	1 00
Samuel Hartwell, Laxton's Alpha Peas,	1 00

JULY 7.

ONIONS.—Twelve, Josiah Crosby,	$2 00
SQUASHES.—Four Long Warted, Warren Heustis,	2 00
CABBAGES.—Four, Josiah Crosby, Henderson's Early,	2 00
Second, Warren Heustis, " "	1 00

Gratuity :—

H. S. Messenger, Marquis of Lorne Cucumbers,	1 00

JULY 14.

POTATOES.—Peck, L. W. Weston, Hebron,	3 00
Second, C. B. Lancaster, Clark,	2 00

Gratuities :—

Samuel Hartwell, Champion Peas,	1 00
George Hill, Emery Tomatoes,	2 00
C. E. Grant, Collection of Beans,	2 00

JULY 21.

CABBAGES.—Four Drumhead, Josiah Crosby,	3 00
TOMATOES.—Twelve, C. N. Brackett, Acme,	3 00
Second, S. Hartwell, Boston Market,	2 00
SWEET CORN.—Twelve ears, S. Hartwell, Marblehead,	3 00
Second, C. N. Brackett, "	2 00

Gratuity :—

M. W. Chadbourne, Potatoes,	1 00

JULY 28.

SQUASHES.—Four Marrow, Josiah Crosby,	3 00
Second, Warren Heustis,	2 00
SWEET CORN.—Twelve ears, J. Crosby, Crosby,	3 00
Second, L. W. Weston, Weston's Early,	2 00
Third, C. E. Grant, Crosby,	1 00
TOMATOES.—Twelve, Samuel Hartwell, Acme,	3 00
Second, C. N. Brackett, "	2 00

Gratuities :—

Francis B. Hayes, Collection of Peas,	2 00
M. W. Chadbourne, Hebron Potatoes,	1 00
L. W. Weston, " "	1 00
Warren Heustis, Rose Potatoes,	1 00

AUGUST 4.

SQUASHES.—Four Marrow, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00
SWEET CORN.—Twelve ears, L. W. Weston, Weston's Early,	2 00
Second, Samuel Hartwell, Crosby,	1 00

Tomatoes.—Twelve, C. N. Brackett, Acme,	$3 00
Second, Samuel Hartwell, "	2 00
Third, C. N. Brackett, Perfection,	1 00
Gratuities:—	
Samuel Hartwell, Potatoes and Tomatoes,	1 00
Warren Heustis, " " Peppers,	1 00

August 11.

Greenflesh Melons.—Four, George Hill,	3 00
Tomatoes.—Twelve Acme, C. N. Brackett,	2 00
Second, Samuel Hartwell,	1 00
Emery, Samuel Hartwell,	2 00
Second, C. N. Brackett,	1 00
Any other variety, Samuel Hartwell, Perfection,	2 00
Second, Samuel Hartwell, Trophy,	1 00
Egg Plant.—Four Round Purple, Joseph G. Coolidge,	3 00
Second, George Hill,	2 00
Gratuities:—	
Josiah Crosby, Onions,	1 00
C. H. Cutler, Celery,	1 00
Samuel Hartwell, Collection,	3 00
C. E. Grant, "	2 00
M. B. Faxon, "	1 00

August 18.

Greenflesh Melons.—Four, George Hill,	2 00
Muskmelons.—Four, Samuel Hartwell,	2 00
Egg Plant.—Four, J. G. Coolidge,	2 00
Second, Daniel Duffley,	1 00
Gratuities:—	
C. E. Grant, Lima Beans,	1 00
C. N. Brackett, Tomatoes,	1 00
J. G. Coolidge, "	1 00
Samuel Hartwell, Collection,	3 00
Francis B. Hayes, "	1 00

August 25.

Potatoes.—Peck, John Cummings, Rose,	2 00
Second, Samuel Hartwell, Hebron,	1 00
Beans.—Large Lima, two quarts, B. G. Smith,	2 00
Second, C. E. Grant,	1 00
Peppers.—Twelve, Warren Heustis,	2 00
Second, Horace Eaton,	1 00

Gratuities:—

George Hill, Melons,	$2 00
M. W. Chadbourne, Melons,	1 00
E. W. Wood, Lima Beans,	1 00
Mrs. E. M. Gill, Sweet Corn,	1 00
Samuel Hartwell, Collection,	2 00
C. E. Grant, "	1 00

SEPTEMBER 1.

WATERMELONS.—Pair, Samuel Hartwell, Black Spanish,	3 00
Second, " " Mountain Sweet,	2 00
GREENFLESH MELONS.—Four, George Hill,	3 00
Second, Samuel Hartwell,	2 00

Gratuities:—

C. E. Grant, Lima Beans,	1 00
W. C. Strong, Ensilage Corn,	1 00
Francis B. Hayes, Collection,	1 00

SEPTEMBER 8.

CAULIFLOWERS.—Four, John Cummings,	3 00
Second, Samuel Hartwell,	2 00
CELERY.—Four roots, Josiah Crosby,	3 00

Gratuity:—

Samuel G. Stone, Lima Beans,	1 00

ANNUAL EXHIBITION.

SEPTEMBER 18, 19, 20, AND 21.

Special Prizes.

CAULIFLOWERS.—Best four specimens, and best kept during the exhibition, John Cummings,	$5 00
CELERY.—Best four specimens, and best kept during the exhibition, Josiah Crosby,	5 00

Regular Prizes.

BEETS.—Twelve Turnip Rooted, George F. Stone,	3 00
Second, Walter Russell,	2 00
Third, George Hill,	1 00
CARROTS.—Twelve Long Orange, George Hill,	3 00
Second, Josiah Crosby,	2 00
Third, John L. D'Wolf,	1 00
Intermediate, Josiah Crosby,	3 00
Second, George Hill,	2 00
Third, Francis B. Hayes,	1 00

PARSNIPS.—Twelve Long, John L. D'Wolf,	$3 00
Second, Francis B. Hayes,	2 00
Third, George Hill,	1 00
POTATOES.—Four varieties, one peck each, John Cummings,	4 00
Second, Aaron Low,	3 00
Third, C. N. Brackett,	2 00
Clark, John Cummings,	3 00
Second, Aaron Low,	2 00
Third, C. B. Lancaster,	1 00
Hebron, John B. Moore,	3 00
Second, John Cummings,	2 00
Third, Samuel Hartwell,	1 00
Peck of Rose, Samuel Hartwell,	3 00
Second, John Cummings,	2 00
Third, J. G. Coolidge,	1 00
Any other variety, John Cummings, King,	3 00
Second, Aaron Low, Jones Prize,	2 00
Third, L. W. Weston, Early Vermont,	1 00
SALSIFY.—Twelve specimens, John L. D'Wolf,	3 00
Second, George F. Stone,	2 00
TURNIPS.—Twelve Flat, George Russell,	3 00
Second, George F. Stone,	2 00
Third, John Cummings,	1 00
Swedish, George F. Stone,	3 00
Second, Francis B. Hayes,	2 00
Third, Mrs. M. T. Goddard,	1 00
ONIONS.—Peck of Danvers, George Hill,	3 00
Second, John Cummings,	2 00
Third, George D. Moore,	1 00
Red, George Hill,	3 00
Second, John Cummings,	2 00
Third, Walter Russell,	1 00
White Portugal, Josiah Crosby,	3 00
Second, Samuel Hartwell,	2 00
Third, John Cummings,	1 00
GREENFLESH MELONS.—Four, C. E. Grant,	3 00
Second, John Cummings,	2 00
Third, Warren Heustis,	1 00
MUSKMELONS.—Four, John Cummings,	3 00
Third prize to S. A. Merrill,	1 00
WATERMELONS.—Pair, Sidney Lawrence, Cuban Queen,	3 00
Second, Samuel Hartwell, " "	2 00
Third, " " Black Spanish,	1 00
SQUASHES.—Four Canada, George Dorr,	3 00
Second, Josiah Pratt,	2 00
Third, John L. D'Wolf,	1 00
Hubbard, John Cummings,	3 00

Second, Walter Russell,	$2 00
Third, J. G. Coolidge,	1 00
Marblehead, John Cummings,	3 00
Marrow, George Hill,	3 00
Second, Walter Russell,	2 00
Third, John Cummings,	1 00
Perfect Gem, C. N. Brackett,	3 00
Second, John Cummings,	2 00
Third, Walter Russell,	1 00
Turban, Aaron Low,	3 00
Second, John Cummings,	2 00
Third, Samuel Hartwell,	1 00
CABBAGES.—Four Drumhead, Samuel Hartwell,	3 00
Second, John Cummings,	2 00
Third, C. B. Lancaster,	1 00
Red, John Cummings,	3 00
Second, Francis B. Hayes,	2 00
Savoy, " " "	3 00
Second, John Cummings,	2 00
Third, C. B. Lancaster,	1 00
CAULIFLOWERS.—Four, John Cummings,	3 00
Second, Samuel Hartwell,	2 00
CELERY.—Four roots, Josiah Crosby,	3 00
Second, George D. Moore,	2 00
ENDIVE.—Four roots, A. F. Allen,	2 00
LIMA BEANS.—Two quarts, Samuel G. Stone,	3 00
Second, Benjamin G. Smith,	2 00
Third, E. W. Wood,	1 00
CORN.—Sweet, twelve ears, John Cummings,	3 00
Second, S. A. Merrill,	2 00
Third, J. G. Coolidge,	1 00
Field, twenty-five ears, traced, Mrs. M. T. Goddard,	3 00
Second, C. N. Brackett,	2 00
Third, Horace Eaton,	1 00
EGG PLANTS.—Four Round Purple, George D. Moore,	3 00
Second, J. G. Coolidge,	2 00
Third, A. F. Allen,	1 00
TOMATOES.—Three varieties, Aaron Low,	4 00
Second, S. G. Stone,	3 00
Third, George W. Pierce,	2 00
Acme, Twelve specimens, John B. Moore,	2 00
Second, John Cummings,	1 00
Emery, George W. Pierce,	2 00
Second, Mrs. A. M. Winn,	1 00
Paragon, John Cummings,	2 00
Second, Samuel G. Stone,	$1 00

Perfection, George W. Pierce,	$2 00
Second, Francis B. Hayes,	1 00
Any other variety, Walter Russell, Boston Market,	2 00
Second, Mrs. A. M. Winn, Livingston's,	1 00
MARTYNIAS.—Twenty-four specimens, George W. Pierce,	2 00
Second, C. E. Grant,	1 00
OKRA.—Twenty-four specimens, A. F. Allen,	2 00
Second, Mrs. M. T. Goddard,	1 00
PEPPERS.—Twenty-four, Josiah Crosby,	3 00
Second, C. N. Brackett,	2 00
Third, George F. Stone,	1 00

Gratuities:—

Warren Heustis, Lettuce,	1 00
Aaron Low, Collection of Potatoes,	2 00
Francis B. Hayes, " "	2 00
Albert Bresee, New Seedling Potatoes, Advance and North Star,	2 00
E. F. Bowditch, Potatoes,	1 00
C. E. Grant, Tomatoes,	1 00
C. N. Brackett, "	1 00
John Cummings, Collection,	3 00

SEPTEMBER 29.

Gratuity:—

S. G. Stone, Lima Beans,	1 00

OCTOBER 6.

CAULIFLOWERS.—Four, Samuel Hartwell,	2 00
CELERY.—Four Roots, Josiah Crosby,	2 00

Gratuity:—

Samuel G. Stone, Lima Beans,	1 00

NOVEMBER 8 AND 9.

CAULIFLOWERS.—Four, the second prize to Samuel Hartwell,	1 00
CELERY.—Four roots, Josiah Crosby,	2 00
Second, C. E. Grant,	1 00

Gratuity:—

Cephas H. Brackett, Tomatoes and Cucumbers,	2 00

REPORT

OF THE

COMMITTEE ON GARDENS,

FOR THE YEAR 1883.

By JOHN G. BARKER, Chairman.

We passed the year 1882 without making any report of our doings. Owing to a combination of circumstances beyond our control, we were invited to visit only one place, that of Edward Haskell, at New Bedford, but by some mistake a part of the Committee went on a day that was not understood by Mr. Haskell to be the one intended, so no one met the Committee, and no report was made. During the present year we have visited only two places, though we have the assurance that other invitations would have been extended but for the continued dry weather, by which we all suffered so much.

Pine Hill, the Residence of Hon. Francis B. Hayes, President of the Society.

Our first visit was to Lexington, on the 12th of June, the principal object being to see the Rhododendrons, which were placed in a much larger tent than the old one, in a new location, in a hollow at the right of and beyond the mansion house. The tent is one hundred and fifty feet long and seventy-five wide, and laid out in a neat and tasteful manner, in beds of various forms, with grass walks. Besides the previously large collection, many new and fine varieties of exquisite beauty have been added, and interspersed at different places were large specimen plants of Indian Azaleas, *Bougainvillea glabra*, *Alsophila excelsa*, and Dracænas, with other foliage and flowering plants, while at each post

was planted a clematis or some other hardy climbing plant. It is only just to say, that on account of the sudden change to warm weather the rhododendrons were not in as good condition as they otherwise would have been, but with a favorable season, and the consummation of the contemplated improvements, the rhododendron tent will be a very attractive and interesting feature of the place.

Near the woods and a little beyond the rhododendron tent, there is building a large stone mansion house, which, when completed and the surroundings improved as proposed, will add greatly to the attractiveness of the estate.

The large pit for the protection of half-hardy plants has been enlarged to twice its former capacity. The value of this pit can hardly be over-estimated, and we repeat what we said in a former report, that the many who have small estates and have not the facilities of a greenhouse, could not do better than to build a pit or partition off a portion of the cellar, where many of the half-hardy plants, so valuable for ornamental purposes, can be protected with very little trouble. In this pit are kept the choice Hybrid Rhododendrons, Indian Azaleas, Hollies, and all half-hardy plants. Hydrangeas, many of which are not hardy, but are valuable for summer decorative purposes, may be safely kept in such a pit, or a cool cellar. Mr. Comley informed us that he gave special attention to ventilation every mild day, keeping it at an average temperature of 38° to 40°, and avoiding all dampness as much as possible.

The grapery was found in a flourishing condition.

All over the grounds additional improvements are constantly being made. We all know that progress marks all the steps of Mr. Hayes, and we hope to have the pleasure of making such notes from time to time as will be of interest to the Society. We hardly need to add that our visit, as on former occasions, was one of much pleasure.

Residence of Benjamin G. Smith, Cambridge.

On the 31st of July the Committee visited the estate of Mr. Smith, on Fayerweather street, Cambridge, which contains about two acres. Mr. Smith retired from business some twenty years ago, and for amusement and recreation has since followed the pursuit which we all so much love and delight in. With what

success his labors have been attended, the numerous exhibitions of his products which you all have witnessed speak for themselves. Mr. Smith has several times taken in the aggregate more prizes for fruits in one year at the Society's exhibitions than any other exhibitor. At the request of the Committee he has furnished us with the following notes, which will be read with interest and will commend themselves to all in like situations.

Mr. Smith says the collection comprises about fifty varieties of Apples, and he commends the Red Astrachan, Williams, Gravenstein, Hubbardston, Baldwin, Garden Royal, Hunt, Mother, Rhode Island, Roxbury, Washington Strawberry, and Foundling. He finds the Hunt more delicious than the Roxbury, and it keeps equally as well. The Garden Royal is one of the best summer dessert apples, standing among apples as Dana's Hovey among pears.

About fifty varieties of Pears are grown, beginning with Doyenné d'Ete, and passing on with Giffard, Clapp's Favorite, Boussock, Howell, Sheldon, Seckel, Urbaniste, Dana's Hovey, Lawrence, etc. All the trees are standards, and many of them, for the sake of economy in room, have several varieties grafted on each without any apparent detriment to fruit or trees. Thinning of the larger kinds is judiciously looked after. The Pound pear is especially commended for culinary purposes; parboiled and then cooked with a little syrup, Mr. Smith has it on his table nearly every day in May and June.

He has four varieties of Peaches, namely, Crawford's Early and Late, George the Fourth, and Coolidge's Favorite, and one variety of Nectarine, but the trees are all short lived, and none have been satisfactory.

Of Quinces there are four varieties, the Orange and Rea's Mammoth being the best. The latter is of very large size, Mr. Smith having taken the first prize at the Autumn Exhibition, October 10, 1882, with twelve fruits, weighing together nine pounds and twelve ounces.

There are nine varieties of Plums,—Coe's Golden, Pond's, Bradshaw, Smith's Orleans, Imperial Gage, Green Gage, Peach, and Bavay's Green Gage. Early in the season the trees are showered with a solution of whale oil soap, which is a preventive of caterpillars, and Mr. Smith thinks it renders the trees and fruit distasteful to other insect depredators. The trees are healthy, and bear fair crops.

There are three varieties of Cherries, which do well, bearing heavy crops, and ripening perfectly. Mr. Smith recommends that dwarf trees should be planted, as they could be more easily protected from the birds.

Of Raspberries there are nine varieties, but the Franconia is preferred, though Mr. Smith speaks of the Souchetti (white) as a favorite berry, and Shaffer's Colossal as a very robust grower and quite prolific.

Among four varieties of Blackberries, the Dorchester is considered best of all.

Mr. Smith has nine varieties of Currants, and thinks the French Transparent the best for table and exhibition purposes. His best currants are produced on bushes on a slope facing north, behind the barn, and where the liquid fertilizing material from the barn cellar finds its way to the garden. He has also shown the Versaillaise, Victoria, Red Dutch, Dana's Transparent, and Black Naples.

There are eight varieties of foreign and native Gooseberries. This is a favorite fruit with Mr. Smith, and he has cultivated it with great success. The soil in which they are planted is a strong loam over two feet deep, and liberally enriched on the surface each year with cow manure. The location is in a border under the partial shade of apple trees and a high board fence a little further north. Mr. Smith gives us as a secret of success, severe pruning, and early thinning out about two-thirds of the berries; and with hellebore powder the currant worms are guarded against. At the time of our visit many of the varieties were ripe, and the Committee enjoyed a practical test of the success attained. For ten years scarcely an instance of mildew has been seen. The varieties are Whitesmith, of which the specimens were magnificent, Wellington's Glory, Yellow Amber, Glenton Green, Downing, and several unnamed sorts.

Of Strawberries, there are nine varieties. For quality the Hervey Davis, Wilder, and Hovey, are considered the leading sorts, but for size and profusion of bearing, the Sharpless is ahead of the others.

Juneberries (*Amelanchier*) and Blueberries, although rather novel as garden fruits, are grown with good success.

Of Hardy Grapes there are thirty-three kinds on trellises, arbors, and stakes. Moore's Early he commends highly for its

many excellent qualities, and for table use he thinks well of the Iona, Brighton, and Eumelan, but informs us that for jellies Mrs. Smith prefers the common wild grape.

The Cold Grapery is a lean-to structure, facing the south; the varieties of grapes planted are Black Hamburg, Victoria Hamburg, Muscat Hamburg, Golden Hamburg, Duchess of Buccleugh, and Lady Downes. It will be noticed that there is quite a variety, which ripen their fruit at different periods of the season; they have all done well together and have not failed to produce a satisfactory crop for eight successive years since they first came into bearing. No artificial heat is used, and Mr. Smith says he experiences no trouble in the management; no exciting stimulants are used. The vines are planted inside, but never watered there, the roots being encouraged to occupy the outside border only. Pruning at the proper time is carefully attended to, as well as pinching the laterals and thinning the fruit in season. Powdered sulphur is scattered freely about the walls and leaves, and mildew, thrip, or red spider is scarcely seen. Ventilation is given by top sliding sashes only; in the warm months the ventilators are open day and night, but in cool damp weather they are closed.

Vegetables are successfully grown in abundance for table use. Mr. Smith's success with Lima Beans for many years is well-known to us all. Like some of our market gardeners, he has abandoned the French system of growing Celery, and plants it on the level as he would any other crop, and gives as a reason that it is more easily cultivated, and when earthed up the water cannot stagnate about the roots and rot the leaves.

While our report shows that much attention has been given to the useful department, the ornamental has not been neglected. We find a collection of a hundred varieties of Hybrid Perpetual Roses, and a good selection of hardy flowering shrubs, among them fine specimens of the very desirable *Hydrangea paniculata grandiflora*, also Lilies, Pæonies, Phloxes, Delphiniums, Iris, etc., with very fine beds of Rhododendrons, Andromedas, and Azaleas,—finely grown plants, which are mulched in autumn with leaves, that remain undisturbed the succeeding summer. Mr. Smith believes fully in the cultivation of hardy plants and shrubs for permanent decorative purposes, and speaks with much pleasure of the great satisfaction he has derived from introducing them into his grounds.

A small octagonal conservatory, attached to the house, is filled each winter with about three hundred plants, access being had by glass doors directly from the library, making that room a cheerful and pleasant place to spend the cold days of winter. We have noticed in successful cultivation there, Carnations, Heliotropes, Amaryllis, Cyclamens, and the usual other varieties of winter flowering plants.

Undoubtedly some will ask how all that we have described is done; we answer, with the help of one man, a common laborer, who does the heavier work, Mr. Smith doing the rest himself, his aim being to make a pleasant home, and to cultivate every variety of fruit worth growing for a private family.

The Committee express great satisfaction at their visit, and only regret that the invitations to such places are not more frequent. They award Mr. Smith a gratuity of $20.

The attention of the members of the Society is called to the change in the arrangements of the Prizes of the Garden Committee for the year 1884, and it is earnestly desired that there may be a lively competition for all the premiums. We ask all the members to aid the Committee as much as possible, by calling their attention to any place or places, a knowledge of which would be of interest or profit to the Society.

JOHN G. BARKER,
WM. H. SPOONER,
E. W. WOOD,
C. N. BRACKETT,
HENRY ROSS,
C. W. ROSS,

Committee on Gardens.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS,

FOR THE YEAR 1883.

The Committee of Arrangements respectfully submit the following report:

Although the season, on account of dry weather, has been somewhat unfavorable to the cultivator, yet the display of fruits, vegetables, plants, and flowers at the several exhibitions has been very fine, and much better than could have been expected.

The Azalea and Rose Show in March was one of the finest ever held by the Society, and was greatly admired by the numerous visitors, as was also the Exhibition of Roses, Strawberries, and Early Vegetables, in June.

The Annual Exhibition, on the 18th, 19th, 20th, and 21st of September was a most successful one, and the fine display of Fruits, Plants, Flowers, and Vegetables was unsurpassed in quality and beauty, and greatly admired by the many who had the good fortune to visit the halls, and was highly satisfactory to the members of the Society.

The Chrysanthemum Show in November, was a decided success, and the beautiful collections exhibited by various growers have never been surpassed. The receipts were highly satisfactory, being more than double those of any other display of the kind.

The exhibitions throughout the year have been carefully looked after and arranged by the Committee, and have proved interesting and attractive to thousands, and we may in truth say that the interest felt in the growth and prosperity of the Massachusetts Horticultural Society is as great, if not greater than ever before.

From the date of the formation of the Society in 1829, a lively interest has been taken in its welfare, and from a small beginning it has become one of the most flourishing institutions in the city.

The details of the various exhibitions have been so fully and faithfully given in the interesting reports of the Committees on Fruits, Flowers, and Vegetables, that it is unnecessary for us to enlarge upon them, as it would, of necessity, be only a repetition; and, as the receipts and expenses are all given in the Treasurer's Report, the members can ascertain from that the pecuniary results of the exhibitions.

C. H. B. BRECK, *Chairman.*

REPORT

OF THE

COMMITTEE ON PUBLICATION AND DISCUSSION,

FOR THE YEAR 1883.

Your Committee report that the lectures and discussions the past season have been maintained with increased interest; they have been listened to by larger audiences than ever before, and were the most successful series ever held by the Society. We believe they are an important factor in the work in which we are engaged, and that it is the duty of our members to sustain them by contributions of information to the extent of their power.

As the discussions of the current year have already been widely distributed, in the form of extra copies of the reports made by the Secretary for the "Evening Transcript," and have also been published under his careful editorial supervision in our TRANSACTIONS, your Committee deem it unnecessary to make an extended report.

The following prizes have been awarded:

For an Essay upon the best method of constructing and heating a Greenhouse for amateur use, taking economy and efficiency into account, to William D. Philbrick, of Newton Centre, a prize of . . .	$25 00
For an Essay upon the question—Are live hedges to be recommended, either for utility or ornament; and if they are, what plants are most suitable?—to John J. Thomas, Union Springs, N. Y., a prize of . .	25 00

BENJ. G. SMITH,
JOHN B. MOORE,
WM. H. HUNT,
} *Committee on Publication and Discussion.*

REPORT

OF THE

COMMITTEE ON THE LIBRARY,

FOR THE YEAR 1883.

There has been but little in the affairs of the Library during the year which calls for special comment. Its growth has been about the same as for many years past.

The income of the Stickney Fund has been expended in the prescribed manner, the Society's appropriation sufficing to keep up our subscription to the periodicals.

An increase in the amount granted a year ago, has enabled the Committee to have a great deal of binding done, thereby making fit for circulation much that in an unbound state was necessarily withheld.

Some of this year's acquisitions, of sufficient importance to deserve notice by title, are Giacomo Zanoni's Istoria Botanica, Bologna, 1675; Karsten's Flora Columbiae, a splendid work, in two large folio volumes, containing colored plates and descriptions of two hundred South American plants, and Jaubert and Spach's Illustrations of Oriental plants, in five volumes, quarto, with five hundred plates.

The successive parts of the Herefordshire Pomona and the Orchid Album have been received as they were issued, and cannot fail to be of great interest to our members. The principal nurserymen, seedsmen, and florists, of America and Europe, have furnished their catalogues, as in previous years.

The sum of one hundred dollars has been spent upon the Card Catalogue. About nine thousand cards have been written this year, against thirteen thousand in 1882, a considerable portion of the time having been spent in placing the cards in alphabetical order in the drawers, a labor demanding the greatest possible

care, for any mistake in arrangement can only be detected by accident. This work has proceeded as far as the letter G, and it is intended to arrange all the cards now ready before writing any more, but by the end of the coming year we believe that at least thirty thousand cards will be in place.

The present year is noteworthy in the annals of botanical literature. That magnificent work, the Flora Danica, begun by the Danish Government one hundred and twenty-two years ago, has reached its conclusion. In 1761, the first fasciculus appeared, its title-page declaring that the work was to contain figures of the plants growing spontaneously in the kingdoms of Denmark and Norway, in the duchies of Sleswick and Holstein, and in the seignories of Oldenburg and Delmenhorst; and though all these dependencies have dropped away in the long march of time, leaving, of all those named, only Denmark under the Danish crown, this noble undertaking has progressed from year to year until now, at the end of four generations since its beginning, it stands complete, unsurpassed by any work of its kind.

This year finishes the first half of the term for which the Stickney fund is available for the use of our Library. The importance of this gift to us can hardly be overrated, for it has paid for the greater part of our most important books. It is this fund which has made it possible for us to gather in this room where we now sit, the finest collection of horticultural books in the world. By the thoughtfulness and kindness of Mr. Stickney, we have been enabled to purchase the elegant and sumptuous works with which our shelves are loaded; the ancient and curious books of gardener's craft, by which we can trace the development of this pure and delightful occupation from its earliest stages; the records of the labors of those who have made the affinities of plants the study of their lives; the accounts of the experiments, observations, and conclusions of the man who, by his "Origin of Species," not only changed the whole course of biological study, but also suggested new methods in all branches of inquiry, and the publications, equally valuable in another direction, of practical cultivators.

So great, however, has been, and is, the activity of these classes of workers, not only in observing and testing, but in publishing, that this fund will find full employment during the rest of the century.

This Committee has, on former occasions, urged the necessity of having all the books in this room, not only for the convenience of readers, but for safety, and an incident which has recently occurred gives force to these representations. Some of the persons to whom our halls were let on the evening of November 28th, broke open the bookcase at the head of the northern stairway leading to the upper hall. This case contains many sets of agricultural and horticultural reports which have been obtained by great effort on the part of the Librarian, and which would be very difficult to complete again, if broken. None of the books appear to have been abstracted this time, yet the occurrence shows that they are not safe in their present position.

In conclusion, this Committee must again make its annual statement that the bookcases are crowded. Behind the books exposed to view, hundreds of others are packed, unseen and therefore unnoted.

For the Committee,

W. E. ENDICOTT, *Chairman.*

LIBRARY ACCESSIONS.

Books Purchased.

Pierre, L., Directeur du Jardin Botanique de Saïgon. Flore Forestière de la Cochin Chine. 5e Fascicule, in continuation. Folio. 16 plates. Paris.

Jaubert, M. le Comte, et M. Ed. Spach. Illustrationes Plantarum Orientalium, ou Choix de Plantes Nouvelles ou Peu Connues de l'Asie Occidentale. 5 vols. 4to. 500 plates and 4 maps. Paris: 1842–1857.

Cesati, V., and others. Flora Italiana. Fasc. 29–31, in continuation. 8vo. 7 plates. 1883.

Willkomm, Maurice. Illustrationes Florae Hispaniae, insularumque Balearium. Livraisons 4, 5, and 6, in continuation. 4to. 28 plates. Stuttgart: 1882.

Flora Danica. Fasc. 51, completing the work. Folio. 60 colored plates. Hauniæ: 1883.

Hallier, Dr. Ernst. Flora von Deutschland. Lieferungen 57–95, in continuation. Small 8vo. Many colored plates. Gera-Untermhaus: 1882–1883.

Schkuhr, Christian. Botanisches Handbuch der mehresten theils in Deutschland wildwachsenden, theils ausländischen in Deutschland unter freiem Himmel ausdauernden Gewächse. Zweite mit dem Nachtrag der Riedgräser vermehrte Auflage. 4 vols. in 6. 8vo. 485 colored plates. Leipsic: 1808.

Seboth, Jos., and F. Graf. Alpenpflanzen. Nos. 42–46, in continuation. 16mo. 45 colored plates. Prague: 1882–83. Also, the English Text to the first three series. Edited by Alfred W. Bennett. London.

Jenkinson, James. A Generic and Specific Description of British Plants; translated from the Genera et Species Plantarum of the celebrated Linnæus, etc. 8vo. 5 plates. Kendal: 1775.

Meyer, Ernestus. De Plantis Labradoricis. 16mo. Leipsic: 1830.

Provancher, L'Abbé L., Curé de Portneuf. Flore Canadienne, ou Descriptions de toutes les Plantes des Forêts, Champs, Jardins, et Eaux du Canada, accompagnée d' un Vocabulaire des Termes Techniques, et de Clefs Analytiques. 8vo. 2 vols. in 1. 420 wood-cuts. Quebec: 1862.

Rafinesque, C. S., A.M., M.D. Medical Flora, or Manual of the Botany of the United States of North America, containing Figures and Descriptions of Medical Plants. 2 vols. 12mo. Wood-cuts. Philadelphia: 1828–1830.

Bongard, M. Observations sur la Végétation de l'Isle de Sitchka. 4to. pamphlet. 1831.

Bruhin, Th. A. Vergleichende Flora Wisconsins. 8vo. 1876, 1877, 1878.

Ward, Lester F., A.M. Guide to the Flora of Washington and vicinity. 8vo. Map. Washington: 1881.

Hemsley, W. B. Biologia Centrali-Americana. Vol. 3, Part 14, October, 1882; Part 16, November, 1883, in continuation. 4to. 10 plates.

Karsten, Hermann. Florae Columbiae Terrarumque Adiacentium Specimina Selecta in Peregratione Duodecim Annorum observata. 2 vols. Folio. 200 colored plates. Berlin: 1858–1869.

Meyen, F. J. F., Ph. D., M. D., etc. Outlines of the Geography of Plants, etc. Translated by Margaret Johnston. 8vo. Plate. London: 1846. [Published by the Ray Society.]

Warner, Williams, & Moore's Orchid Album. Vol. 2, Parts 17–24; Vol. 3, Parts 25-29, in continuation. 4to. 52 colored plates. London: 1882, 1883.

Mueller, Baron Ferd. von. Eucalyptographia. Decades 3–8, in continuation. 4to. 60 plates Melbourne: 1879–1882.

Moore, Thomas, F. L. S., and George Jackman, F. R. H. S. The Clematis as a Garden Flower, etc. 8vo. 17 plates. London: 1872.

Bentham, George, and J. D. Hooker. Genera Plantarum. Vol. 3, Part 2, completing the work. 8vo. London: 1883.

Baillon, H. The Natural History of Plants. Translated by Marcus M. Hartog. Vols. 1 and 2. 811 wood-cuts. Royal 8vo. London: 1871.

Smith, Sir James Edward, M. D., F. R. S. A Grammar of Botany, illustrative of Artificial as well as Natural Classification, with an Explanation of Jussieu's System. To which is added a reduction of all the Genera contained in the Catalogue of North American Plants to the Natural Families of the French professor; by the late Henry Muhlenburg, D.D. 8vo. 21 colored plates. New York: 1822.

The Botanist's Calendar and Pocket Flora, arranged according to the Linnæan System. To which are added references to the best figures of British Plants. 2 vols. 16mo. London: 1797.

Zanoni, Giacomo. Istoria Botanica, etc. Folio. 80 plates. Bologna: 1675.

Linnean Society's Journal,—Botany. Vols. 18 and 19, and Nos. 123–129, in continuation. 8vo. London: 1880–1883.

Schlechtendahl, D. F. L. von (vols. 1–34), und Dr. Aug. Garcke (Neue Folge, vols. 35–43). Linnæa; ein Journal für die Botanik in ihrem ganzen Umfange. 43 vols. 8vo. Many plates. Berlin: 1826–1882.

Dodel-port, Dr. Arnold and Caroline. Anatomical and Physiological Atlas of Botany. Parts 5 and 6, large folio, 12 colored plates; also handbooks, small 8vo. in continuation. 1883.

M'Alpine, D., F. C. S. The Botanical Atlas, a Guide to the Study of Plants, containing representations of the leading forms of plant life. 2 vols. Large 4to. Vol. 1, Phanerogamia; Vol. 2, Cryptogamia. 52 colored plates. Edinburgh: 1883.

Todaro, Augustine. Hortus Botanicus Panormitanus, etc. Vol. 2, Fasc. 2 and 3, in continuation. Folio. 4 colored plates. Palermo: 1879–1882.

Keith, Rev. Patrick, Clerk, F. L. S. A Botanical Lexicon, or Expositor of the Terms, Facts, and Doctrines of the Vegetable Physiology, brought down to the present time. 8vo. London: 1837.

Saunders, W. Wilson. Refugium Botanicum. Vol. 2, Parts 2 and 3, and Vol. 5, Part 3, completing the set. 8vo. 72 plates. London: 1872, 1879, 1882.

Hooker, W. J., LL.D., F. R. A. & L. S., etc. Companion to the Botanical Magazine. 2 vols. 8vo. 32 colored plates. London: 1835 and 1836.

Darwin, Charles, M. A., LL.D., F. R. S. The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life. 6th edition. Small 8vo. London: 1882.

Muller, Prof. Hermann. The Fertilization of Flowers. Translated and edited by D'Arcy W. Thompson, B. A., with a preface by Charles Darwin. 8vo. 186 wood-cuts. London: 1883.

Masters, Maxwell T., M. D., F. R. S. Life on the Farm. Plant Life. Small 8vo. London: 1883. [Handbook of the Farm Series.]

Balfour, John Hutton, A. M., M. D. Edin., F. R. S., Sec. R. S. E., F. L. S. A Manual of Botany, being an Introduction to the Study of the Structure, Physiology, and Classification of Plants. 5th edition. 963 wood-cuts. Small 8vo. Edinburgh, 1875.

Balfour, John Hutton. The Botanist's Companion, or Directions for the Use of the Microscope, and for the Collection and Preservation of Plants, with a Glossary of Botanical Terms. 2d edition. Small 8vo. 21 wood-cuts. Edinburgh: 1875.

Hofmeister, Dr. Wilhelm. Translated by Frederick Currey, M. A., F. R. S., On the Germination, Development, and Fructification of the Higher Cryptogamia, and on the Fructification of the Coniferæ. 8vo. 65 plates. London: 1862. [Published by the Ray Society.]

Karsten, H. Pharmaceutische Medicinische Botanik. Lieferungen 7–12, in continuation. 8vo. Many wood-cuts. Berlin: 1882, 1883.

Zippel, Hermann, and Karl Bollmann. Repräsentanten Einheimischer Pflanzenfamilien. 2d Abtheilung, 3d Lieferung, in continuation. 8vo., with folio atlas of 12 colored plates. Braunschweig: 1882.

Christy, Thomas, F. L. S. New Commercial Plants, with directions how to grow them to the best advantage. No. 5. 8vo. London.

London, George, and Henry Wise. The Retir'd Gardiner. 2 vols. 8vo. Plates. London: 1706.

The Theory and Practice of Gardening, etc. Translated from the French Original, printed at Paris, Anno 1709, by John James, of Greenwich. 4to. 32 plates. London: 1712.

Hogg, Robert, LL.D., F. L. S., editor. The Herefordshire Pomona, Parts 5 and 6, in continuation. Folio. 25 colored plates. London and Hereford: 1882 and 1883.

Barron, Archibald F. Vines and Vine Culture, being a Treatise on the Cultivation of the Grape Vine; with Descriptions of the Principal Varieties. 8vo. 31 plates and 48 wood-cuts. London: 1883.

Bridgeman, T. The Florist's Guide, containing practical directions for the cultivation of Annual, Biennial, and Perennial Flowering Plants, of different classes, Herbaceous and Shrubby, Bulbous, Fibrous, and Tuberous Rooted, including the Double Dahlia. 12mo. New York: 1835.

Green, Roland. A Treatise on the Cultivation of Ornamental Flowers; comprising remarks on the requisite Soil, Sowing, Transplanting, and General Management, with directions for the general treatment of Bulbous Flower Roots, Greenhouse Plants, &c. 12mo. Boston and New York: 1828.

Journal of a Horticultural Tour through some parts of Flanders, Holland, and the North of France, in the Autumn of 1817, by a Deputation of the Caledonian Horticultural Society [Patrick Neill, John Hay, and James Macdonald]. 8vo. Plates. Edinburgh: 1823

Journal de la Société Imperiale et Centrale d'Horticulture de France, Fevrier, 1867. 8vo. pamphlet. [Towards completing the set.]

Iowa Horticultural Society. Report for 1867, by W. W. Beebee, Secretary, and Report for 1870, by D. W. Adams, Secretary. 2 vols. 8vo. Des Moines: 1868 and 1871. [Towards completing the set.]

Beddome, Major R. H., Conservator of Forests. The Flora Sylvatica for Southern India, containing quarto plates of all the principal Timber Trees in Southern India and Ceylon, accompanied by a Botanical Manual, with Descriptions of every known Tree and Shrub, and analysis of every Genus not figured in the plates. 2 vols. 4to., 359 plates. Madras: 1869–1873.

Lavallée, Alphonse. Arboretum Segrezianum; Icones Selectæ Arborum et Fruticum in Hortis Segrezianis collectorum. Livraison 5, in continuation. Folio, 5 plates. Paris.

Forbes, James. Salictum Woburnense, or a Catalogue of Willows, Indigenous and Foreign, in the collection of the Duke of Bedford, at Woburn Abbey, systematically arranged. 4to. Frontispiece, and 140 colored plates. London: 1829. [Not published; only 50 copies printed.]

Hale, P. M. The Woods, Forests, and Timbers of North Carolina. 12mo. Raleigh: 1883.

English Forests and Forest Trees, Historical, Legendary, and Descriptive, with numerous illustrations. 8vo. London: 1853.

McWilliam, Robert, Architect and Surveyor. An Essay on the Origin and Operation of the Dry Rot, with a view to its Prevention or Cure. To which are annexed Suggestions on the Cultivation of Forest Trees, and an abstract of several Forest Laws, from the reign of Canute to the present time. 4to., plates. London: 1818.

Fries, Elia. Icones Selectæ Hymenomycetum, Vol. 1, Parts 4–10; Vol. 2, Parts 1–8, in continuation. Folio. 150 colored plates. Upsal: 1877.

Gonnermann, Dr. W. and Dr. L. Rabenhorst. Mycologia Europæa. Heften 7–9, completing the work. Folio. 18 colored plates.

Lucand, L. Figures peintes de Champignons. Fasc. 3 and 4, in continuation. 4to., 50 colored drawings.

United States Entomological Commission. First Annual Report, for the year 1877, relating to the Rocky Mountain Locust, etc. 8vo. Map, 5 plates, and 101 wood-cuts. Washington: 1878.

Saunders, William, F. R. S. C., etc. Insects Injurious to Fruits. 8vo. 440 wood-cuts. Philadelphia: 1883.

Cooke, Matthew, Chief Executive Horticultural Officer. A Treatise on the Insects Injurious to Fruit and Fruit Trees of the State of California, and Remedies recommended for their Extermination. 8vo. pamphlet. 75 wood-cuts. Sacramento: 1881.

Royal Agricultural Society of England. Journal, Second Series, Vol. 19, Part 2. 8vo. London: 1883.

Compleat Body of Husbandry, etc. Compiled from the Original Papers of the late Thomas Hale, Esq., and enlarged by communications from the collections of Col. Stevenson, Mr. Randolph, Mr. Hawkins, Mr. Storey, Mr. Osborne, the Reverend Mr. Turner, and others. 2d edition. 4 vols., 8vo Plates. London: 1758.

Battles, Frederick, A. M. The Farmer's Manual, being a plain, practical Treatise on the Art of Husbandry, designed to promote an acquaintance with the modern improvements in Agriculture, together with remarks on Gardening, and a Treatise on the Management of Bees. 12mo. Hartford: 1819.

Harney, George E., Architect, Newburgh and Cold Spring, N. Y. Stables, Outbuildings, and Fences, illustrated with a series of 120 original designs and plans, with descriptive matter. 4to. 62 plates. New York: no date.

Black's General Atlas of the World. Folio. Edinburgh: 1882.

Books Received by Donation and Exchange.

Macoun, John, M. A., F. L. S., F. R. S. C. Catalogue of Canadian Plants. Part 1, Polypetalæ 8vo. pamphlet. Montreal: 1883. [Geological and Natural History Survey of Canada; Alfred R. Selwyn, Director.] The Author.

Young, Herbert A. Catalogue of the Flora of Oak Island, Revere, Mass. With notes. 8vo. pamphlet. Salem: 1883. The Peabody Academy of Science.

Wheeler, Charles F., and Erwin F. Smith, Hubbardston, Mich. Catalogue of the Phænogamous and Vascular Cryptogamous Plants of Michigan, Indigenous, Naturalized, and Adventive. 8vo. pamphlet. Lansing: 1881. Erwin F. Smith.

Linnean Society of London. Proceedings, July, 1882, from November, 1875, to June, 1880. List of members, October, 1881, October, 1882. 3 pamphlets. 8vo. Benjamin Daydon Jackson, Secretary.

Atti del Congresso Internazionale Botanico, tenuto in Firenze nel mese di Maggio, 1874. Publicati per cura della R. Società Toscana di Orticultura. 8vo. Plates and wood-cuts. Florence: 1876. Tuscan Horticultural Society.

Davenport, George E. Geographical Distribution of Ferns in the United States. 8vo. pamphlet. 1883. [Read before the American Philosophical Society, February 2, 1883.] The Author.

Beal, Professor William J. The New Botany. A Lecture on the best method of teaching the science. 8vo. pamphlet. Philadelphia: 1882. The Author.

Bulletin of the Torrey Botanical Club. January, 1883. 8vo. pamphlet. Professor William R. Dudley. [With article on "Leafy Berries in Mitchella repens," and plate, by Professor Dudley.]

Joly, M. Note sur l' Horticulture en Espagne et en Portugal. [Extrait du Journal de la Société Nationale et Centrale d' Horticulture. 3e série, t. V., 1883, pp. 119–132.] The Author.

Hexamer, Dr. F. M., Editor. The American Garden, an Illustrated Journal of Horticulture. Vols. 1, 2, and 3, 1880, 1881, and 1882. Small folio. New York: 1882. B. K. Bliss & Sons, publishers.

Main, James, A.L.S. Popular Botany. 16mo. Many plates and wood-cuts. London: 1835. J. D. W. French.

Krelage, J. H. Aschenanalysen von Hyacinthus Orientalis. Gelbe Hyacinthen. 2 pamphlets 8vo. Berlin: 1883. [From the Garten Zeitung.] The Author.

Gibb, Charles, Abbotsford, Quebec. Report on Russian Fruits. A Paper from the Eighth Report of the Montreal Horticultural Society. 8vo. pamphlet. Montreal: 1883. The Author.

Barry, William C. New and Rare Fruits, 1882. New and Noteworthy Trees, Shrubs, and Conifers. 2 pamphlets, 8vo. Rochester: 1883. 2 copies. The Author.

Pabor, William E. Fruit Culture in Colorado. A Manual of Information compiled by him. 8vo. pamphlet. Colored plates. Denver: 1883. The Author.

Green, Charles A. Green's Fruit Grower, 1881, 1882. Folio. Rochester, N. Y.: 2 copies. The Publisher.

Illustrated Descriptive Catalogue of American Grape Vines; a Grape Grower's Manual, by Bush, Son, & Meissner, Viticulturists and Proprietors of the Bushberg Vineyards and Grape Nurseries, Jefferson County, Missouri. 3d edition. Royal 8vo. 3 colored plates, and many wood-cuts. St. Louis: 1883. Isidor Bush.

Boutteville, L. de, D.-M., et A. Hauchecorne. Le Cidre, etc. 5th edition. 12mo. Rouen. Ch. Joly.

Joly, Ch. Note sur le Potager Royal de Frogmore. 8vo. pamphlet. [Extrait du Journal de la Société Nationale d'Horticulture de France. 3 série, t. V., 1883, pp. 329–334.] The Author.

L'Horticulture et les Engrais Chimiques. Expériences faites à Saint-Ouen-l'Aumône (Seine et Oise) par M. Alfred Dudoüy. Rapport présenté a l'Assemblée Générale de la Société des Agriculteurs de France, le 31 Janvier, 1883, par M. Ch. Joly. 8vo. pamphlet. Paris: 1883. M. Joly.

Exposition Internationale d' Horticulture, organisée d'après l'Auguste Autorisation de Sa Majesté l'Empereur, par la Société Impériale d' Horticulture de Russie, à St. Petersbourg, en Mai, 1883. 8vo. pamphlet. St. Petersburg: 1883. M. Greig, President.

Joly, Charles. Note sur la XIe Exposition Internationale de Gand. [Extrait du Journal de la Société Nationale d' Horticulture. 3e série, t. V., 1883, pp. 470–475.] 8vo. pamphlet. Paris: 1880. The Author.

Société Nationale et Centrale d' Horticulture de France. Journal 1871–1882, 12 vols., in numbers. Also, Journal 3e Série, Tome 4, Janvier, 1882, and Tome 5, Janvier, 1883. 2 pamphlets, 8vo. Paris. The Society. Address of M. Alphonse Lavallée, President, August 16, 1883, 4to., 4 pages, and Souvenir de l' Exposition de Mai, 1883, Photo-lithograph. Ch. Joly.

Société Centrale d' Horticulture du Département de la Seine Inférieure. Bulletin, Tome 24, 3e et 4e Cahiers de 1882; Tome 25, 2e Cahier de 1883. 3 pamphlets. 8vo. Rouen. The Society.

Société d' Horticulture de la Sarthe. Bulletin, 8 trimestres, 1872-1880. Also, 1er et 2e trimestres, 1883. 10 pamphlets, 8vo. Le Mans. The Society.

R. Società Toscana di Orticultura. Bulletino, Anno 1, 1876. 8vo. Florence: 1876. Also, the volume for 1883, in monthly numbers. Florence: 1883. The Society.

Primo Congresso degli Orticultori Italiani tenuto in Firenze dal 20 al 25 Maggio, 1880. 8vo. Florence: 1880. Tuscan Horticultural Society.

Joly, M. Ch. Compte Rendu de la 2e Exposition Nationale de la Fédération Horticole Italienne a Turin. 8vo. pamphlet. [Extrait du Journal de la Société Nationale d'Horticulture. 3e série, t. IV., 1882, pp. 730–736.] The Author.

Montreal Horticultural Society and Fruit Growers' Association of the Province of Quebec. Eighth Report, for the year 1881–2. 8vo. pamphlet. Montreal: 1883. 7 copies. Henry S. Evans, Secretary.

Worcester County Horticultural Society. Transactions for A. D. 1882, with the Premium Schedule for 1883. 8vo. pamphlet. Worcester, 1883. Edward W. Lincoln, Secretary.

New York Horticultural Society. Monthly Reports, etc. 9 pamphlets. 8vo. James Y. Murkland, Secretary.

Western New York Horticultural Society. Proceedings at the Twenty-eighth Annual Meeting, Rochester, January 24 and 25, 1883. 8vo. pamphlet. Rochester: 1883. P. C. Reynolds, Secretary.

New Jersey State Horticultural Society. Proceedings at the Eighth Annual Meeting, held at Freehold, January 9 and 10, 1883. 8vo. pamphlet. Newark: 1883. E. Williams, Recording Secretary.

Pennsylvania Horticultural Society. Programme for the year 1883. 8vo. pamphlet.

Mississippi Valley Horticultural Society. Transactions for the year 1883. Vol. 1. By William H. Ragan, Secretary. 8vo. Indianapolis: 1883. Parker Earle, President.

Ohio State Horticultural Society. Sixteenth Annual Report, for the year 1882–83. 8vo. pamphlet. Columbus: 1883. George W. Campbell, Secretary,

Indiana Horticultural Society. Transactions for the year 1872. By William H. Ragan, Secretary. 8vo. Indianapolis: 1883.

Illinois State Horticultural Society. Transactions for the year 1882. 8vo. Morris: 1883. O. B. Galusha, President.

Missouri State Horticultural Society. Report for the year 1882. 8vo. pamphlet. Jefferson City: 1883. S. M. Tracy, Secretary.

Kentucky Horticultural Society. Proceedings, September 20–22, 1881. 8vo. pamphlet. Frankfort: 1882. Minutes of the Regular Annual Meeting, September 26 and 27, 1882. 12mo. pamphlet. Louisville: 1882. J. Decker, Secretary.

Michigan State Horticultural Society. Twelfth Annual Report of the Secretary, 1882. 8vo. Lansing: 1883. 10 copies. Charles W. Garfield, Secretary.

Kansas Horticultural Society. Report for the year 1882. Vol. 12. 8vo. Kansas City, Mo.: 1883. The Society.

Wisconsin Horticultural Society. Transactions 1876, 1879–80, 1880–81, 1881–82 (3 copies of the last). 6 vols. 8vo. Madison: 1876–1882. William Trelease, Secretary.

Minnesota Horticultural Society. History from 1866 to 1873. 8vo. St. Paul: 1873. Transactions 1874–1878, 1880. 5 pamphlets and 1 vol., completing the set. 8vo. Minneapolis and St. Paul: 1874–1880, James Bowen, Librarian.

Fruit Growers' Association and International Show Society of Nova Scotia. Transactions and Reports, 1883. 8vo. pamphlet. Halifax: 1883. C. R. H. Starr, Secretary.

Ontario Fruit Growers' Association. Reports for the years 1881 and 1882; with the Reports of the Entomological Society. Printed by order of the Legislative Assembly. 8vo. Many wood-cuts. Toronto: 1882, 1883. The Secretary of the Department of Agriculture, and another copy from B. Gott.

Wilder, Marshall P., President of the American Pomological Society. Address at the Nineteenth Session of the Society, held in Philadelphia, September 12, 13, and 14, 1883. 8vo. pamphlet. Boston: 1883. The Author.

Maine State Pomological Society. Transactions for the year 1882, including the Proceedings of the Meeting held at Waterville, January 30 and 31, 1883. 8vo. pamphlet. Augusta: 1883. George B. Sawyer, Secretary.

Sturtevant, E. Lewis, M. D. Indian Corn. Presented by request at the Annual Meeting of the New York State Agricultural Society, January 22, 1879, and reprinted from the Thirty-eighth Annual Report, 1878. 8vo. pamphlet, new edition, with postscript. The Author.

Souvenir of a visit to Messrs. Suttons' Seed Establishment. Itinerary, and Notes for Visitors to the Royal Berkshire Seed Establishment, during the Royal Agricultural Show week, July, 1882. 2 pamphlets, square 8vo. J. D. W. French.

Investigation of the Scientific and Economic Relations of the Sorghum Sugar Industry, being a report in response to a request from the Hon. George B. Loring, United States Commissioner of Agriculture, by a Committee of the National Academy of Sciences, November, 1882. 8vo. Washington: 1883. The Commissioner.

United States Department of Agriculture. Report of the Commissioner for the years 1881 and 1882. 8vo., many plates. Washington: 1882. Hon. George B. Loring, Commissioner.

——— ——— ——— — ———. Special Reports, Nos. 53–65, December, 1882, to September, 1883. Also, New Series, Division of Statistics, Nos. 1 and 2, October and November, 1883. 15 pamphlets, 8vo. Washington: 1883. The Commissioner.

United States Department of Agriculture. Miscellaneous Special Report, No. 2. Proceedings of a Convention of Agriculturists, held at the Department of Agriculture, January 23, 24, 25, 26, 27, and 29, 1883. (Second Convention.) 8vo. pamphlet. Washington, 1883. The Commissioner.

———. Chemical Division. Bulletin No. 1. An Investigation of the Composition of American Wheat and Corn. Clifford Richardson, Assistant Chemist. 8vo. pamphlet. Washington: 1883. The Commissioner.

Sociedad Rural Argentina. Anales: Revista quincenal de Ganaderia y Agricultura. Vol. 16, Nos. 11, 15, 16, 18, and 19, and Vol. 17, Nos. 1 and 7–24. 24 numbers, large 8vo. Buenos Ayres: 1882 and 1883. D. Leonardo Pereyra, Presidente Comision Directiva.

American Agricultural Review and Journal of the American Agricultural Association, May, 1882. 8vo. pamphlet. A. W. Cheever. Journal, November, 1882, January, 1883, and February and March (extra), 1883. 3 pamphlets. 8vo. New York, Chicago, and London. J. H. Reall, Secretary.

Transactions of the Agricultural Societies of the State of Maine, for 1853. Arranged from Official Returns, by E. Holmes, Secretary of the Board of Agriculture. 8vo. Augusta: 1854.

Maine State Agricultural Society. Report of the Secretary, and Transactions of the several County Agricultural Societies for the year 1855. By E. Holmes, Secretary. 8vo. Wood-cuts. Augusta: 1859.

Maine Board of Agriculture. Twentieth Annual Report of the Secretary, for the year 1875. 8vo. Augusta: 1875.

Wasson, Samuel. A Survey of Hancock County, Maine. 8vo. pamphlet. Augusta: 1878.

New Hampshire Board of Agriculture. Tenth and Eleventh Annual Reports for the years 1880 and 1881, by James C. Adams, Secretary. 8vo. William H. Hills.

Massachusetts Board of Agriculture. Thirtieth Annual Report of the Secretary, with Returns of the Finances of the Agricultural Societies for 1882. 8vo. Boston: 1883. John E. Russell, Secretary.

Essex Agricultural Society. Transactions for the year 1882, with the Sixtieth Annual Address, by Francis H. Appleton. Order of Arrangements, Premiums, and Committees, at the Sixty-third Annual Exhibition, at Salem, September 25 and 26, 1883. 2 pamphlets. 8vo. Charles P. Preston, Secretary.

Hampden Agricultural Society. Thirty-eighth Annual Report, etc., with List of Premiums for 1883. 8vo. pamphlet. Springfield: 1883.

Connecticut State Board of Agriculture. Sixteenth Annual Report of the Secretary, 1882–83. 8vo. Hartford: 1883. T. S. Gold, Secretary.

New York State Agricultural Society. Transactions, Vol. 32, 1872–1876. 8vo. Albany: 1878. Also, Journal, Vol. 20, 1870, in numbers. 8vo. Albany. T. L. Harison, Secretary.

Georgia Department of Agriculture. Publications for 1880, 1881, and 1882. Vols. 6, 7, and 8, 3 vols., 8vo. Atlanta: 1881–1883. Circulars, Nos. 34–38, 40-46, and 48. 13 pamphlets. 8vo. Atlanta: 1882–1883. Also, a Manual of Poultry, prepared under the direction of the Commissioner. 8vo. pamphlet. Atlanta: 1883. J. T. Henderson, Commissioner.

Randolph County (Indiana), Agricultural, Horticultural, and Mechanical Association. Thirteenth Annual Fair, at Winchester, September 11–14, 1883; Premium List. 8vo. pamphlet. Winchester: 1883. D. E. Hoffman, Secretary.

Nebraska State Board of Agriculture, and the State Horticultural Society. Annual Reports to September, 1879. 8vo. pamphlet. Lincoln: 1880. Hon. Robert W. Furnas, President of the State Horticultural Society.

Colorado State Board of Agriculture and State Agricultural College. Report, 1881–1882. Denver: 1883. Also, Fourth Annual Register of the Agricultural College, 1881–1882, 1882–1883. 2 pamphlets, 8vo. Fort Collins: 1883. E. A. Sawtelle.

California State Agricultural Society. Transactions during the year 1882. 8vo. Sacramento: 1883. Edwin M. Smith, Secretary.

Massachusetts State Agricultural Experiment Station. Bulletin, Nos. 1–5. July to November, 1883. 5 pamphlets, 8vo. Prof. C. A. Goessmannn, M. D., Director.

New York State Agricultural Experiment Station. First Annual Report of the Board of Control. 8vo. Albany: 1883. E. Lewis Sturtevant, A. M., M. D., Director.

Houghton Farm Experiment Department. Series 1, Nos. 1 and 2, Agricultural Physics, 1882; Metereology and Soil Temperatures, by D. P. Penhallow, B. S. Series 3, Nos. 1 and 2, Diseases of Plants, 1882; Normal Condition of Cellular Structure and Peach Yellows, by D. P. Penhallow, B. S. 2 pamphlets, royal 8vo. 4 plates. Professor Penhallow.

Annuaire des Eaux et Forêts, pour 1883. 22e année. 24mo. Paris: 1883. Publisher of the Revue des Eaux et Forêts.

Scottish Arboricultural Society. Transactions, Vol. 10, Part 2. 8vo. pamphlet. Edinburgh: 1883. John McLaren, Jr., Secretary and Treasurer.

Gibb, Charles, Abbotsford, Quebec. Hasty Notes on Trees and Shrubs in Northern Europe and Asia. 8vo. pamphlet. Montreal: 1883. [From the Report for 1883 of the Montreal Horticultural and Fruit Growers' Association of Province of Quebec], 2 copies. The Author.

United States Census Office. Forestry Bulletin, No. 23. Broadside; Map, etc. Washington: January 15, 1883.

Hough, Franklin B. Report upon Forestry, prepared under the direction of the Commissioner of Agriculture, in pursuance of an Act of Congress approved August 15, 1876. 8vo. Vol. 2. Washington: 1880. Vol. 3, 1882. The Commissioner.

New Jersey State Agricultural Experiment Station. First, Second, and Third Annual Reports, for the years 1880, 1881, and 1882. 8vo. pamphlet. George B. Hurff, Assistant Chemist.

Maryland Farmer. Twenty numbers, to complete volumes. 8vo. Baltimore: 1874–1881. Ezra Whitman, Editor and Publisher.

Annual Report of the Director of the Arnold Arboretum to the President and Fellows of Harvard College, for 1881–1882. 8vo. pamphlet. Cambridge: 1883. Charles S. Sargent, Director.

Report of the Joint Committee on Public Lands in Relation to the Public Garden, July, 1850. Boston City Document, No. 18. 8vo. pamphlet. Boston: 1850. Benjamin G. Smith.

Boston Department of Parks. Seventh Annual Report of the Board of Commissioners, January 28, 1882. 8vo. pamphlet. Maps. Boston: 1882. Benjamin G. Smith. Eighth Annual Report, January 27, 1883. 8vo. pamphlet, 3 maps and 3 photographs. Boston: 1883. The City of Boston.

Brooklyn Park Commissioners. Twenty-second and Twenty-third Annual Reports for 1881 and 1882. 2 pamphlets. 8vo. Brooklyn: 1882 and 1883. Andrew A. Smith, Secretary.

Baltimore Park Commissioners. Twenty-third Annual Report, for the Fiscal Year, ending December 31, 1882. 8vo. pamphlet. Maps. Baltimore: 1883.

Chicago South Park Commissioners. Reports to the Board of County Commissioners of Cook County, for the years 1878, 1879, 1881, and 1882.. 4 pamphlets. 8vo. Chicago: 1878–1882. H. W. Harmon, Secretary.

Cleveland, H. W. S. Suggestions for a System of Parks and Parkways for the City of Minneapolis. 8vo. pamphlet. Map. Minneapolis: 1883. The Author.

Garfield, Charles. Embellishment of School Grounds. 8vo. pamphlet. [From the Michigan Horticultural Report, 1883.] The Author.

Mount Auburn Cemetery. Annual Report to the Trustees, with the Reports of the Treasurer and Superintendent. January, 1883. 8vo. pamphlet. Boston: 1883.

Pine Grove Cemetery. Twenty-ninth Annual Report of the Board of Commissioners, together with a Schedule of the Receipts and Expenditures for the year 1882, and a Catalogue of the Proprietors of Lots. 8vo. pamphlet. Lynn: 1883. John G. Barker, Superintendent.

United States Department of Agriculture. Report upon Cotton Insects, prepared under the direction of the Commissioner of Agriculture, by J. Henry Comstock, Entomologist to the Department. 8vo. 8 plates, 77 wood-cuts. Washington: 1879. The Commissioner of Agriculture.

——— ——— ——— — ———. Division of Entomology. Bulletin No. 1. Report of Experiments, chiefly with Kerosene, upon the Insects injuriously affecting the Orange Tree and the Cotton Plant, made under the direction of the Entomologist.

United States Department of Agriculture. Division of Entomology. Bulletin No. 2. Reports of Observations on the Rocky Mountain Locust and the Chinch Bug. Together with Extracts from the Correspondence of the Division, on Miscellaneous Insects.

Bulletin No. 3. Reports of Observations and Experiments in the Practical Work of the Division, made under the direction of the Entomologist, Charles V. Riley. 3 pamphlets. 8vo. Washington: 1883. Charles V. Riley.

United States Entomological Commission. Bulletin No. 3. The Cotton Worm, etc. By Charles V. Riley. 8vo. pamphlet. 84 wood-cuts. Washington: 1880.

Bulletin No. 6. General Index, and Supplement to the Nine Reports on the Insects of Missouri, by Charles V. Riley, M. A., Ph. D. 8vo. pamphlet. Washington: 1881. The Secretary of the Interior, by request of the Author.

Scudder, Samuel H. The Pine Moth of Nantucket, Retinia Frustrana. 8vo. pamphlet. 1 colored plate. Boston: 1883. [Published by the Massachusetts Society for the Promotion of Agriculture] 2 copies. The Author.

Maine State College of Agriculture, and the Mechanic Arts. Annual Reports of the Trustees and Officers for 1870, 1872–1877, 1881, and 1882. 9 pamphlets. 8vo. Augusta: 1871–1882. Merritt C. Fernald, President.

Kansas State Agricultural College. Catalogue, 1882–1883. 8vo. pamphlet. Manhattan: 1883.

Massachusetts Institute of Technology. Eighteenth Annual Catalogue of the Officers and Students, with a Statement of the Course of Instruction, etc. 1882–1883. Boston: 1882.

Illinois Industrial University. Tenth and Eleventh Annual Reports of the Board of Trustees, 1879–1882. 2 vols. 8vo. Springfield: 1881, 1882. Also, Biennial Report to the State Superintendent of Public Institutions, by the Regent, November 17, 1882, and Catalogue and Circular, 1882–1883. 2 pamphlets. 8vo. Champaign: 1882, 1883. James D. Crawford, Librarian.

Illinois State Laboratory of Natural History. Bulletin No. 3, November, 1880, and No. 6, May, 1883. 2 pamphlets. 8vo. S. A. Forbes, Director. [Contains papers by Professor Forbes, on the Food of Birds, and on the Regulative Action of Birds upon Insect Oscillations.]

Smithsonian Institution. Annual Report of the Board of Regents, showing the Operations, Expenditures, and Condition of the Institution for the year 1881. 8vo. Wood-cuts. Washington: 1883.

Essex Institute. Bulletin, Vol. 13, 1881; Vol. 14, Nos 1–6. 8vo. Salem: 1881–1883. The Institute.

Boston Society of Natural History. Proceedings, Vol. 21, Parts 2 and 3, December, 1880, January, 1882. 2 pamphlets. 8vo. Plates. Boston: 1882. Memoirs, Vol. 3, No. 5. 4to. pamphlet. 3 plates. Boston: 1882. The Society.

Indiana Department of Geology and Natural History. Twelfth Annual Report, by John Collett, State Geologist, 1882. 8vo. 38 plates. Indianapolis: 1883. D. E. Hoffman.

La Nature. January, 1883. 8vo. pamphlet. Paris. Ch. Joly.

Annual Report of the Chief Signal Officer to the Secretary of War, for the years 1872, 1879, 1880, and 1881. 4 vols. 8vo. Many charts, etc. Washington: 1873, 1880, and 1881. Also, duplicate copies. Brigadier and Brevet Major General W. B. Hazen, Chief Signal Officer of the Army.

Signal Service Notes, No. 1. Report on the Michigan Forest Fires of 1881, by Sergeant William O. Bailey. No. 2, on the Use of Homing Pigeons for Military Purposes, by 1st Lieut. William E. Berkheimer. 2 pamphlets. 8vo. Washington: 1882. No. 4, The Use of the Spectroscope in Meteorological Observations. By Winslow Upton, A.M. Prepared under the direction of the Chief Signal Officer of the Army. 8vo. pamphlet. 3 charts. Washington: 1883. The Chief Signal Officer.

Signal Service Professional Papers, No. 2. Isothermal Lines of the United States, 1871–1882. By Lieut. A. W. Greely. 4to. pamphlet. 12 charts. Washington: 1881. The Chief Signal Officer.

Lynn Public Library. Twentieth Annual Report of the Trustees, for the year 1882. 8vo. pamphlet. Lynn: 1883. Edward S. Davis, President of the Trustees.

Astor Library. Thirty-fourth Annual Report of the Trustees, for the year 1882. 8vo. pamphlet. New York: 1883. F. Saunders, Librarian.

Mercantile Library Association of the City of New York. Sixty-second Annual Report of the Board of Direction, May, 1882–April, 1883. 8vo. pamphlet. New York: 1883.

Library Company of Philadelphia. Bulletin. New Series, Nos. 11 and 12, July, 1883, and January, 1884. 2 pamphlets. 8vo. Lloyd P. Smith, Librarian.

Quaritch, Bernard. General Catalogue of Books, Parts 2 and 3. 2 vols. 8vo. London: November, 1881, and May, 1882. The Publisher.

Friedländer, R. & Sohn. Bibliotheca Historico-Naturalis et Mathematica. 8vo. Berlin: 1883. The Publishers.

United States Bureau of Education. Report of the Commissioner for the year 1881. 8vo. Washington: 1883. Circulars of Information, Nos. 3–6, 1882; Nos. 1–3, 1883. 7 pamphlets, 8vo. Washington: 1882, 1883. Also 8 other pamphlets and broadsides relating to Education. Hon. John Eaton, Commissioner.

American Antiquarian Society. Proceedings at the Annual Meeting held at Worcester, October 21, 1882, and at the Semi-Annual Meeting, April 25, 1883. Also List of Publications, compiled by Nathaniel Paine. 3 pamphlets. 8vo. Worcester: 1883.

New England Historic Genealogical Society. Proceedings at the Annual Meeting, January 3, 1883. 8vo. pamphlet. Boston: 1883.

Minnesota Historical Society. Biennial Report to the Legislature of Minnesota, Session of 1883. 8vo. pamphlet. Minneapolis: 1883.

Bowdoin College. Eighty-first and Eighty-second Annual Catalogues, for the Academic years 1882–1883 and 1883–1884. 2 pamphlets. 8vo. Brunswick: 1882, 1883. The Librarian.

Boston; What to See, and How to See it. 32mo. Boston: 1883. Moses King, publisher.

Central and Western Nebraska, and the Experience of its Stock Growers. Nebraska and its Settlers; What they have done, and how they do it; its Crops and its People. Creameries and Dairying in Nebraska. Corn is King, and How it Rules in Nebraska. 4 pamphlets. 8vo. Compiled by J. T. Allan. Omaha: 1882, 1883. The Compiler.

Texas; Resources, Soil, and Climate of. Report of A. W. Spaight, Commissioner of Statistics. 8vo. Map. Galveston: 1882. E. A. Sawtelle.

Report of the Secretary of the Interior for the Fiscal Year ending June 30, 1882. 8vo. pamphlet. Washington: 1882.

In Memoriam. Henry Brooks Ellwanger. Small 4to. pamphlet. Rochester: 1883. George Ellwanger.

In Memoriam. Dr. John A. Warder. 8vo. pamphlet. [From the American Journal of Forestry, August, 1883.] Hon. Marshall P. Wilder. 6 copies.

Periodicals Purchased.

English. — Gardeners' Chronicle.
Gardeners' Magazine.
Journal of Horticulture and Cottage Gardener.
The Garden.
Gardening Illustrated.
Curtis's Botanical Magazine.
Florist and Pomologist.
Journal of Botany.
Journal of Forestry.

French. — Revue Horticole.
Revue des Eaux et Forêts.

Belgian. — Illustration Horticole.
Flore des Serres.
Belgique Horticole.
Revue de l' Horticulture, Belge et Étrangère.

German. — Botanische Zeitung.
Gartenflora.

American.—Country Gentleman.
American Journal of Forestry.
American Naturalist.

Periodicals Received in Exchange.

Gardener's Monthly.
Canadian Horticulturist.
Ladies' Floral Cabinet.
Rural Californian.
American Garden.
Vick's Illustrated Monthly Magazine.
Green's Fruit Grower.
Bowditch's Magazine.
Seed Time and Harvest.
Bulletin of the Torrey Botanical Club.
Botanical Gazette.
The Scientific Roll.
Maine Farmer.
The Home Farm.
Mirror and Farmer.
New England Farmer.
Massachusetts Ploughman.
American Cultivator.
New England Homestead.
American Agriculturist.
Rural New Yorker.
The Husbandman.
American Rural Home.
Maryland Farmer.
Florida Dispatch.
Prairie Farmer.
The Industrialist.
Boston Daily Advertiser.
Boston Morning Journal.
Boston Post.
Boston Daily Globe.
Boston Evening Transcript.
Daily Evening Traveller.
The Cottage Hearth.

Books, etc., Wanted.

☞ *Persons having any of the books in the following list to dispose of will oblige by addressing the "Librarian of the Massachusetts Horticultural Society, Horticultural Hall, Boston."*

Bolton's Filices Britannicæ, Part 2. 4to. Huddersfield, 1790.
Sowerby's English Botany, Supplement to the 1st edition; Vol. 5, including all the plates beyond No. 2,960.
Curtis's Beauties of the Rose. Vol. 2. 4to.
Parnell's Grasses of England. 8vo. Edinburgh: 1845.

Murray, Andrew, on the Synonymy of various Conifers, — all but Part 1.

——— ———. Notes upon Californian Trees, all but Part. 1.

Bateman's First Century of Orchidaceous Plants.

Lindley's Folia Orchidacea, Part 9.

Floral World, 1866.

Royal (London), Horticultural Society's Journal, between Vol. 9, 1854, and Vol. 6 [New Series?], 1880.

Annales de la Société d'Horticulture de Paris, January, 1832.

Bulletin de la Société d'Horticulture du Département de la Seine Inferièure (formerly Société de Rouen), Tome 5, Cahier 4; Tome 7, Cahier 1; Tome 14, Cahier 2. Also, Tome 2, Cahier 8; Tome 3, Cahiers 2 and 6; being Cahiers 1, 2, and 3 of Tome 1 of Pomologie (pp. 1–52, 53–76, and 77–108). Also, Tome 1, Cahier 6, Pomologie (pp. 159–175); Tome 2, Cahier 3, Pomologie.

Bulletin de la Société d'Horticulture de la Sarthe. All previous to 1872.

Indiana Horticultural Society. Transactions at the first nine sessions, previous to 1871.

Missouri Horticultural Society. Reports previous to 1880, except that of the 5th meeting, in 1864.

Iowa State Horticultural Society. Reports previous to 1867; also 1868, 1869, 1871 and 1874.

Nebraska Horticultural Society. Transactions, other than 1871, 1872, 1877–1878, and 1879.

Ontario Fruit Growers' Association. Reports previous to 1869.

Pennsylvania Fruit Growers' Society. Reports previous to 1867.

Ohio Nurserymen and Fruit Growers' Convention Reports. Ohio Pomological Society's Reports, except the Fourth and Eighth Sessions, 1852 and 1857.

United States Patent Office Agricultural Reports, 1839, 1842, 1848.

United States Department of Agriculture; Special Reports, 14 and 15, First Series.

Reports of the Consuls of the United States on the Commerce, Manufactures, etc., of their Consular Districts. Nos. 1, 2, 4, 5, 8–10, 14, 16, 18–20, 23, 27–29.

Virginia Commissioner of Agriculture, First Annual Report.

Illinois Entomological Reports; First, by B. D. Walsh.

Iowa Forestry Annual, — all but No. 5, 1879.

Boston Park Reports. City Documents, No. 123, 1869; No. 15, 1879; Nos. 84, 111, 118, 1880; Nos. 23, 93, 124, and 134, 1881; No. 148, 1882, and No. 150, 1883.

Central Park, New York. Second Report, 1859, with map.

Brooklyn Park Reports. 12th, 1871, 13th, 1872, and all subsequent to 1882.

Fairmount Park. Fourth Annual Report of the Commissioners, with illustrations.

The Phytologist. First series, 1842–1855.

Revue Horticole. First Series, Vols. 1–3, Paris: 1829–1840; Second Series, Vols. 1–5, 1841–1846.

The Flower Garden. Published by Beach & Son, Brooklyn. Sept. 1872–June 1874, 8 numbers. American Garden: The four numbers for 1876, July and October, 1877, and January, 1878, and the four numbers for 1879.

California Horticulturist. Vols. 7 and 8, and the January, February, March, April, and July numbers of Vol. 9.

Semi-Tropic California, January, 1881, and March, 1882.

The Semi-Tropical (Jacksonville, Fla.). Vol. 1, 1875, the March number of Vol. 3., and the March number of Vol. 4.

Journal of the New York State Agricultural Society. Vol. 11, Nos. 1, 4, 7, and 9. Vol. 12, No. 12. Vol. 13, Nos. 10, 11, and 12. Vol. 14, Nos. 3, 5, 7, 9, 10, 11, and 12. Vol. 15, Nos. 3, 4, 6, 7, and 12. Vol. 16, No. 2, and the whole of Vols. 17, 18, and 19.

American Agricultural Association Review and Journal, January, 1882, and February and March, 1883.

New England Farmer. 8vo. 1864. Part of Vol. 16.

American Agriculturist. Vol. 1, No. 2; Vol. 2, No. 1; and Vols. 9, 11, 15, 22, and 23.

Country Gentleman. Vol. 2, Nos. 27, 28, 29, and 30. Also, Title page and Index.

American Farmer. Fifth Series. Vol. 3, Nos. 7–12, January–June, 1862, and the succeeding volumes to 1873, inclusive, also the numbers for October and December, 1877, and April to December, inclusive, 1878.

Maryland Farmer, March, 1875.

Anales de la Sociedad Rural Argentina. Vol. 16, Nos. 3, and 20.

American Agricultural Annual, Nos. 1, 2, and 3, 1867, 1868, and 1869.

American Horticultural Annual, Nos. 1, 4, and 5, 1867, 1870, and 1871.

Prairie Farmer Annual, Nos. 3 and 4, 1869 and 1870.

Massachusetts Agricultural College, 1st, 2d, 3d, 17th, 18th, 19th, and 21st, Annual Reports.

Ontario School of Agriculture, 1st, 2d, and 3d Reports, 1875, 1876, and 1877.

REPORT

OF THE

SECRETARY AND LIBRARIAN,

FOR THE YEAR 1883.

Besides the gradual increase of work in all departments, the most noteworthy variation from the former work of the Secretary has been the printing of extra copies of the reports in the "Evening Transcript," of the meetings for discussion. The report of each Saturday's meeting has thus been placed on our tables the following week, and has proved highly acceptable to members of the Society and others. Under these circumstances special pains have been taken to make the reports as accurate and complete as the time admissible for preparing a report for a daily paper, and the space allowed, would permit.

In the library, drawers for the accommodation of the Card Catalogue have been added to all the bookcases in the smaller room, and in doing this the bookcases, which were much settled by the weight of the books, have been, in effect, rebuilt, and are now more substantial than ever before. In replacing the books they have been better classified, and the improvement of the classification, as well as the completion of imperfect volumes and sets throughout the library, has been diligently pursued. The increase of the appropriation for binding, etc., has permitted the thorough repair, which was much needed, of the ancient books mentioned in the report of the Library Committee for 1882, as purchased during that year, and also the reduction, to some extent, of the accumulation of books needing binding. This work also will be continued during the coming year, and it is believed that the present appropriation will, if continued for a few years, enable us to entirely clear off this accumulation.

ROBERT MANNING,
Secretary and Librarian.

TREASURER'S REPORT,

FOR THE YEAR 1883.

RECEIPTS.

Cash on hand as per last report,	$8,332 38
Rent of Halls,	7,439 72
" " Stores,	10,119 00
Admissions and Assessments,	890 00
Library, Sale of Books,	30 00
Sale of History,	10 50
Sale of Transactions,	4 00
Mount Auburn Cemetery,	4,399 68
Annual Exhibitions,	950 61
Special Rose Prizes,	10 00
Sundries,	94 12
	$32,280 01

EXPENDITURES.

Labor,	$1,073 02	
Salaries,	2,275 00	
Incidentals,	156 75	
Interest,	3,454 16	
Taxes,	3,522 32	
Repairs on Building,	262 53	
Heating ($415.95) and water ($14.38), less paid by tenants,	430 33	
Lighting,	955 07	
Furniture and Fixtures,	513 20	
Prizes,	2,770 65	
Committee of Arrangements,	429 85	
Committee on Publication and Discussion,	25 00	
Stationery, Postage, and Printing,	997 19	
Stickney Fund,	710 95	
Carried forward,	$17,576 02	

Brought forward,		$17,576 02
Library,		330 00
Card Catalogue,		100 00
Reduction of Floating Debt,		9,000 00
Rights on Montgomery Place,		50 50
Damages from Accident, and Legal Services,		1,080 98
Cash on hand December 31, 1883,		4,142 51
		$32,280 01

ASSETS.

Real Estate, Furniture, and Exhibition ware,		$256,585 56
Library last year,	$21,646 12	
Added this year,	1,000 00	
		22,646 12
Bonds, C., B. & Q. R. R., at par,		1,500 00
Stereotype Plates, and copies of History,		394 00
Cash on hand December 31, 1883,		4,142 51
		$285,268 19

LIABILITIES.

Mortgage debt, bearing interest at 4½ per cent. per annum, due October 1, 1888,	$60,000 00	
Loan, without interest, payable to Harvard College in 1899,	12,000 00	
Note payable to Massachusetts National Bank,	3,000 00	
		75,000 00
Surplus,		$210,268 19

MEMBERS.

Number of Life Members per last report,	583
Added during the year,	13
	596
Deceased,	8
	588

Annual Members per last report,			274	
Added during the year,			17	
			291	
Deceased,		5		
Discontinued,		2		
		—	7	
				284
Total number of members,				872
Income from membership:				
13 Life Members,			$390 00	
17 Annual Members,			170 00	
165 Assessments,			330 00	
				$890 00

The Finance Committee having audited the accounts of the undersigned, made and have subscribed to, on a book kept for that purpose, the following report:

The Massachusetts Horticultural Society
In account with GEORGE W. FOWLE, *Treasurer.*

Credit.

By balance in treasury, December 31, 1882,	$8,332 38
" Total income as per receipt book,	23,947 63
	$32,280 01

Contra Debit.

To cash paid out as per disbursement book,	$28,137 50
" Balance to new account,	4,142 51
	$32,280 01

BOSTON, February 1, 1884. We have examined the above account, and find it correct, and the balance of cash on hand forty-one hundred and forty-two dollars and fifty-one cents, as stated.

(Signed) H. H. HUNNEWELL, FRANCIS B. HAYES, FRED'K L. AMES, } *Finance Committee.*

For the year 1883 the average income of the Society, from rental of Halls, Stores, and Mount Auburn Cemetery has been about the same as in 1882. The floating debt of $12,000 has been reduced to $3,000 during the past year, and this balance of $3,000 will be paid in January, 1884, from funds now on hand.

The mortgage debt of $60,000, at 5½ per cent. interest, has been renewed for five years, coming due October 1, 1888, and the annual rate of interest has been reduced to 4½ per cent.

The rental of Stores for 1884 is expected to show an increase of about twenty-five hundred dollars.

GEO. W. FOWLE, *Treasurer.*

BOSTON, February 7, 1884.

Dr. *Massachusetts Horticultural Society, in account with the Proprietors of the Cemetery of Mt. Auburn.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31st, 1883.

Cost of filling up and improving land at Mt. Auburn, for the year ending December 31, 1883; the Massachusetts Horticultural Society being charged with their proportion of the same:		By Sales in January,	$451 00
Ivy Path,	$487 00	" " " February,	263 00
Chant and Watriss Lots,	1,875 63	" " " March,	440 00
Pearl Avenue to Eagle Avenue,	934 87	" " " April,	587 50
	$3,297 50	" " " May,	3,499 75
		" " " June,	4,942 50
		" " " July,	2,996 00
		" " " August,	1,338 75
		" " " September,	1,089 75
		" " " October,	3,569 00
		" " " November.	1,321 00
		" " " December,	1,242 00
		Net amount receipts from Receiving Tomb,	643 00
			$22,383 25
		Less graves repurchased,	37 00
			$22,296 25
		Deduct for Annual Expenses,	1,400 00
One-quarter of $3,297.50 is	$824 38	Mass. Horticultural Society one-fourth part of	$20,896 25
Balance due Massachusetts Horticultural Society,	4,399 68		
	$5,224 06		$5,224 06

E. & O. E.

December 31, 1883.

H. B. MACKINTOSH, *Treasurer.*

MASSACHUSETTS HORTICULTURAL SOCIETY,

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during 1883:

Ivy Path.

240	days, men,	$480 00		
2	" man and horse,	7 00		
				$487 00

Chant and Watriss Lot.

138½	days, men,	$277 00		
456¾	" man and horse,	1,598 63		
				1,875 63

Pearl Avenue to Eagle Avenue.

145	days, men,	$290 00		
184¼	" man and horse,	644 87		
				934 87
				$3,297 50
	One-fourth part of $3,297.50 is			$824 38

J. W. LOVERING, *Sup't.*

MOUNT AUBURN, Dec. 31, 1883.

I certify the foregoing to be a true copy of accounts of improvements for the year 1883, rendered by the Superintendent.

H. B. MACKINTOSH, *Treasurer.*

Massachusetts Horticultural Society.

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WARREN HEUSTIS.		NATHANIEL T. KIDDER.

MEMBERS FOR LIFE.

Change of residence, or any inaccuracies, should be promptly reported to the Secretary.

Adams, George E.,	Medford.	Bates, Caleb,	Kingston.
Albro, Charles,	Taunton.	Bayley, John P.,	Boston.
Alger, R. F.,	Becket.	Beal, Alexander,	Dorchester.
Allan, David,	Mount Auburn.	Beckford, D. R., Jr.,	Dedham.
Ames, Frank M.,	Canton.	Bell, Joseph H.,	Quincy.
Ames, Frederick L.,	North Easton.	Bemis, Emery,	Grantville.
Ames, George,	Boston,	Berry, James,	Boston.
Ames, P. Adams,	"	Bickford, Weare D.,	Allston.
Amory, Charles,	"	Birchard, Charles,	Framingham.
Amory, Frederick,	Brookline.	Black, James W.,	Boston.
Amory, James S.	Boston.	Blagg, Samuel,	Newbern, N. C.
Anderson, Alexander,	Hingham.	Blanchard, J. W.,	Boston.
Andrews, Charles L.,	Swampscott.	Blaney, Henry,	Brookline.
Andrews, Frank W.,	Boston.	Blinn, Richard D.,	Chicago, Ill.
Andros, Milton,	Brookline.	Bliss, William,	Springfield.
Appleton, Edward,	Reading.	Bocher, Ferdinand,	Boston.
Appleton, Francis H.,	Peabody.	Bockus, Charles E.,	Dorchester.
Appleton, Wm. S.,	Boston.	Bond, George W.,	Boston.
Atkins, Elisha,	Belmont.	Borland, John N.,	New London, Ct.
Avery, Edward,	Boston.	Botume, John,	Stoneham.
Ayer, Adams,	"	Bouvé, Thomas T.,	Boston.
Ayling, Isaac,	"	Bowditch, Azell C.,	Somerville.
		Bowditch, J. Ingersoll,	Boston.
Bacon, George,	Brookline.	Bowditch, Wm. E.,	"
Bailey, Edwin C.,	Concord, N. H.	Bowker, William H.,	"
Baker, William E.,	Boston.	Brackett, Cephas H.,	Brighton.
Bancroft, John C.,	Milton.	Brackett, Charles N.,	Newton.
Banfield, Francis L.,	Boston.	Bradish, Levi J.,	Boston.
Barnard, Rev. C. F.,	"	Bragg, Samuel A. B.,	Mattapan.
Barnard, James M.,	"	Breed, Henry A.,	Lynn.
Barnard, Robert M.,	Everett.	Bresee, Albert,	Hubbardton, Vt.
Barnes, Walter S.,	Somerville.	Brewer, John Reed,	Boston.
Barnes, William H.,	Boston.	Brewer, Otis,	"
Barney, Levi C.,	"	Brigham, William T.,	"
Barratt, James,	Cambridgeport.	Brimmer, Martin,	"
Barrett, Edwin S.,	Concord.	Brintnall, Benjamin,	"
Barrows, Thomas,	Dedham.	Brooks, Francis,	Medford.
Bartlett, Edmund,	Newburyport.	Brown, Charles E.,	Yarmouth, N. S.
Bates, Amos,	Hingham.	Brown, Edward J.,	Brookline.

Brown, G. Barnard,	Boston.	Clay, Henry,	Dorchester.
Brown, George B.,	"	Cleary, Lawrence,	West Roxbury.
Brown, Jacob,	Woburn.	Clement, Asa,	Dracut.
Brownell, E. S.,	Essex Junc., Vt.	Cleveland, Ira,	Dedham.
Bruce, Nathaniel F.,	Stoneham.	Cobb, Albert A.,	Brookline.
Bullard, John R.,	Dedham.	Coburn, Isaac E.,	Everett.
Bullard, William S.	Boston.	Codman, James M.,	Brookline.
Burnett, Joseph,	Southborough.	Codman, Ogden,	Lincoln.
Burnham, T. O. H. P.,	Boston.	Coffin, G. Winthrop,	West Roxbury.
Burr, Fearing,	Hingham.	Coffin, William E.,	Boston.
Burr, Matthew H.,	"	Converse, E. S.,	Malden.
Buswell, Edwin W.,	New York, N.Y.	Converse, Parker L.,	Woburn.
Buswell, Frank E.,	" " "	Coolidge, Joshua,	Watertown.
Butler, Aaron,	Wakefield.	Copeland, Franklin,	West Dedham.
Butler, Edward K.,	Jamaica Plain.	Cox, George P.,	Malden.
Butterfield, Wm. P.,	Arlington.	Coy, Samuel I.,	Boston.
		Crocker, George O.,	New Bedford.
Cadness, John,	Flushing, N. Y.	Crocker, Uriel,	Boston.
Cains, William,	South Boston.	Crosby, Josiah,	Arlington.
Calder, Augustus P.,	Boston.	Crowell, Philander,	Chelsea.
Capen, John,	"	Crowell, Randall H.,	"
Carlton, Samuel A.,	Somerville.	Cummings, John,	Woburn.
Carruth, Charles,	Boston.	Curtis, Charles F.,	Jamaica Plain.
Carruth, Nathan,	Dorchester.	Curtis, George S.,	" "
Carter, Miss Sabra,	Wilmington.	Cushing, Robert M.,	Boston.
Chamberlain, C. W.,	Arlington.		
Chapin, N. G.,	Brookline.	Daggett, Henry C.,	Boston.
Chapman, Edward,	Arlington.	Damon, Samuel G.,	Arlington.
Chase, A. J.,	Lynn.	Dana, Charles B.,	Brookline.
Chase, Daniel E.,	Somerville.	Darling, Charles K.,	Boston.
Chase, Hezekiah S.,	Boston.	Davenport, Edward,	Dorchester.
Chase, William M.,	Baltimore, Md.	Davenport, Geo. E.,	Boston.
Cheney, Benjamin P.,	Boston.	Davenport, Henry,	"
Child, Francis J.,	Cambridge.	Davis, Curtis,	Cambridge.
Child, William C.,	Medford.	Davis, Hervey,	Cambridgeport.
Childs, Francis,	Charlestown.	Dawson, Jackson,	Jamaica Plain.
Childs, N. R.,	Dorchester.	Deblois, Stephen G.,	Boston.
Claflin, Henry,	Brighton.	Denny, Clarence H.,	"
Claflin, William,	Newton.	Denny, R. S.,	Dorchester.
Clapp, Edward B.,	Dorchester.	Denton, Eben,	Braintree.
Clapp, E. W.,	Walpole.	Dewson, Francis A.,	Boston.
Clapp, James H.,	Dorchester.	Dexter, F. Gordon,	"
Clapp, William C.,	"	Dickerman, Geo. H.,	Somerville.
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Clark, William S.,	Amherst.	Dike, Charles C.,	Stoneham.
Clark, W. L.,	Neponset.	Dinsmore, Wm. B.,	New York, N.Y.
Clarke, Miss Cora H.,	Jamaica Plain.	Dix, Joseph,	Boston.

Dorr, George,	Dorchester.
Dove, George W.W.,	Andover.
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Durfee, Mrs. F. B.,	Fall River.
Durfee, George B.,	" "
Dutcher, F. J.,	Hopedale.
D'Wolf, John L.,	Boston.
Eaton, Horace,	Quincy.
Eldridge, Azariah,	Yarmouthport.
Eldridge, E. H.,	Boston.
Ellicott, J. P.,	Jamaica Plain.
Endicott, William E.,	Canton.
Eustis, William C.,	Hyde Park.
Everett, George,	Concord.
Everett, Otis,	Boston.
Everett, William,	"
Fairchild, Charles,	Belmont.
Farlow, John S.,	Newton.
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Fay, Mrs. R. L.,	Chelsea.
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Fewkes, Arthur H.,	Newton Highl'ds
Fewkes, Edwin,	" "
Fillebrown, John,	Arlington.
Fisher, James,	Boston.
Fisher, Warren,	"
Flagg, Augustus,	"
Fleming, Edwin,	West Newton.
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Fletcher, J. Henry,	Belmont.
Fletcher, John W.,	Chelsea.
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Foster, Francis C.,	Cambridge.
Foster, John H.,	Boston.
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Freeland, Chas. Wm.,	Boston.
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French, Jonathan,	"
Fuller, Henry Weld,	"
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Gardner, Henry N.,	Belmont.
Gardner, John L.,	Brookline.
Gibbs, Wolcott,	Cambridge.
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Gilson, F. Howard,	Reading.
Glover, Albert,	Boston.
Glover, Joseph B.,	"
Goddard, A. Warren,	Brookline.
Goddard, Mrs. M. T.,	Newton.
Gorham, James L.,	Jamaica Plain.
Gould, Francis,	Arlington.
Gould, Samuel,	Boston.
Gray, James,	Wellesley.
Gregory, J. J. H.,	Marblehead.
Greig, George,	Newton.
Grinnell, Joseph,	New Bedford.
Groom, Thomas,	Dorchester.
Grundel Hermann,	"
Guild, J. Anson,	Brookline.
Hadwen, Obadiah B.,	Worcester.
Hall, Edwin A.,	Cambridgeport.
Hall, George A.,	Chelsea.
Hall, George R.,	Fort George, Fla.
Hall, John R.,	Boston.
Hall, Lewis,	Cambridge.
Hall, Stephen A.,	Revere.
Hall, William F.,	Brookline.
Halliday, William H.,	Boston.
Hammond, Gard. G.,	"
Hammond, Samuel,	"
Hanson, P. G.,	Woburn.
Harding, C. L.,	Cambridge.
Harding, George W.,	Dorchester.
Harding, Lewis B.,	Boston.
Harding, W. C.,	"
Hardy, F. D., Jr.,	Cambridgeport.
Harrington, L. B.,	Salem.
Harris, Charles,	Cambridge.
Hart, William T.,	Boston.
Hastings, Edm. T.,	Boston.
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Haughton, James,	Boston.
Haven, Alfred W.,	Portsm'th, N. H.
Hayes, Daniel F.,	Exeter, N. H.
Hayes, Francis B.,	Boston.
Hayward, Daniel H.,	No. Cambridge.
Hazeltine, Hazen,	Boston.

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Hill, George,	Arlington.	Kennard, Charles W.,	Boston.
Hill, John,	Stoneham.	Kennedy, George G.,	"
Hilton, William,	Boston.	Kent, John,	Charlestown.
Hitchings, E. H.,	"	Keyes, E. W.,	Denver, Col.
Hodgkins, John E.,	Chelsea.	Keyes, George,	Concord.
Hollis, George M.,	Grantville.	Kidder, Henry P.,	Boston.
Hollis, John W.,	Brighton.	Kidder, Nath'l T.,	"
Holt, Mrs. S. A.,	Winchester.	Kimball, A. P.,	"
Hooper, Robert C.,	Boston.	King, Franklin,	Dorchester.
Hooper, Thomas,	Bridgewater.	Kingman, Abner A.,	Brookline.
Horner, Mrs. C. N. S.,	Georgetown.	Kingman, C. D.,	Middleborough.
Hovey, Charles H.,	Cambridgeport.	Kinney, John M.,	Roxbury.
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Hovey, John C.,	"	Kittredge, E. A.,	Boston.
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Hubbard, G. G.,	Cambridge.	Lawrence, Amos A.,	Brookline.
Hubbard, J. C.,	Boston.	Lawrence, Edward,	Charlestown.
Hubbard, William J.,	"	Lawrence, James,	Groton.
Huckins, J. W.,	"	Lawrence, John,	Boston.
Humphrey, F. J.,	Dorchester.	Lee, Henry,	"
Humphrey, G. W.,	Dedham.	Leeson, Joseph R.,	Newton Centre.
Hunneman, Jos. H.,	Boston.	Lemme, Frederick,	Arlington.
Hunnewell, Arthur,	Wellesley.	Leuchars, Robert B.,	Boston.
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Inches, Herman B.,	"	Lord, George C.,	Newton.
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Kendall, Edward,	Cambridgeport.	Lunt, Charles H.,	Jamaica Plain.

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Moore, John H.,	"	Pierce, George W.,	Everett.
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Morse, Samuel F.,	"	Pierce, Samuel B.,	"
Morse, Sidney B.,	"	Poole, Benjamin C.,	Chelsea.
Morse, William A.,	"	Poor, John R.,	Somerville.
Motley, Thomas,	West Roxbury.	Potter, Joseph S.,	Arlington.
Mudge, George A.,	Portsm'th, N. H.	Prang, Louis,	Boston.
Mudge, George W.,	Lynn.	Pratt, Lucius G.,	West Newton.
Munroe, Otis,	Boston.	Pratt, Robert M.,	Boston.
		Pratt, William,	Winchester.
Needham, Daniel,	Groton.	Pray, Mark W.,	Malden.
Newhall, George,	Dorchester.	Prescott, C. H.,	Cornwallis, N.S.
Newman, J. R.,	Winchester.	Prescott, Eben C.,	Boston.
Newton, Rev. W. W.,	Boston.	Prescott, W. G.,	"
Nickerson, Albert W.,	Dedham.	Prescott, William G.,	Quincy.
Norton, Charles W.,	Allston.	Preston, George H.,	Boston.
Nourse, Benjamin F.,	Boston.	Preston, John,	Dorchester.
Nourse, Benjamin F.,	Cambridgeport.	Pringle, Cyrus G.,	Charlotte, Vt.
		Proctor, Thomas P.,	West Roxbury.
Oakman, Hiram A.,	No. Marshfield.	Prouty, Gardner,	Littleton.
Osgood, Jas. Ripley,	Boston.	Putnam, Joshua H.,	Brookline.
Otis, Theodore C.,	"		
Oxnard, George D.,	"	Ramsay, A. H.,	Cambridge.
		Rand, Edward S.,	Boston.
Packer, Charles H.,	Boston.	Rand, Miss E. L.,	Newton Highl'ds.

Rand, Oliver J.,	Cambridgeport.	Smith, Calvin W.,	Grantville.
Rawson, W. W.,	Arlington.	Smith, Charles H.,	Jamaica Plain.
Ray, James F.,	Franklin.	Smith, Chauncey,	Cambridge.
Ray, James P.,	"	Smith, Edward N.,	San Francisco.
Ray, Joseph G.,	"	Smith, George O.,	Boston.
Reed, George W.,	Boston.	Smith, James H.,	Needham.
Richards, John J.,	"	Smith, W. B.,	Boston.
Richards, William B.,	"	Snow, Eben,	Cambridge.
Richardson, C. E.,	Cambridge.	Snow, Miss Salome H.,	Brunswick, Me.
Richardson, Geo. C.,	"	Sparhawk, Edw'd C.,	Brighton.
Rinn, J. Ph.,	Boston.	Spaulding, Edward,	Jamaica Plain.
Robbins, I. Gilbert,	"	Spaulding, M. D.,	Boston.
Robbins, Nathan,	Arlington.	Speare, Alden,	Newton Centre.
Robeson, W. R.,	Boston.	Spencer, Alfred M.,	Dorchester.
Robinson, John,	Salem.	Springall, George,	Malden.
Rogers, John H.,	Boston.	Springer, John,	Sterling.
Ross, Henry,	Newton.	Stetson, Nahum,	Bridgewater.
Ross, M. Denman,	Boston.	Stickney, Rufus B.,	Somerville.
Ross, Waldo O.,	"	Stimpson, George,	New York, N. Y.
Ruddick, Dr. Wm. H.,	South Boston.	Stimpson, H. H.,	Cambridge.
Russell, George,	Woburn.	Stone, Amos,	Everett.
Russell, John E.,	Leicester.	Stone, George F.,	Newton.
Russell, Walter,	Arlington.	Stone, Phineas J.,	Charlestown.
		Story, E. Augustus,	Brighton.
Sampson, George R.,	New York, N.Y.	Strong, William C.,	Newton Highl'ds.
Sanborn, Amos C.,	Cambridgeport.	Sturgis, John H.,	Boston.
Sanford, O. S.,	Oxford, Md.	Sturgis, Russell Jr.,	"
Sargent, Charles S.,	Brookline.	Sturtevant, E. Lewis,	Geneva, N. Y.
Sargent, Ignatius,	"	Sumner, Edward,	Dedham.
Saville, Richard L.,	"	Surette, Louis A.,	Concord.
Sawtelle, Eli A.,	Boston.	Swain, Charles D.,	Roxbury.
Sawyer, Timothy T.,	Charlestown.		
Scott, Charles,	Newton.	Taft, John B.,	Boston.
Scudder, C. W.,	Brookline.	Tappan, Charles,	"
Sears, J. Montgomery,	Boston.	Taylor, Horace B.,	"
Seaver, Nathaniel,	East Boston.	Thacher, Alfred C.,	Dorchester.
Seaver, Robert,	Jamaica Plain.	Thayer, Henry,	No. Cambridge.
Shaw, C. C.,	Milford, N. H.	Thayer, Nathaniel,	Boston.
Shaw, S. P.,	Cambridge.	Thurlow, Thomas C.,	Newburyport.
Sheafe, Charles C.,	Boston.	Tidd, Marshall M.,	Woburn.
Sheafe, William,	Brookline.	Tilton, Stephen W.,	Boston.
Sheldon, Oliver S.,	Milton.	Todd, John,	Hingham.
Shimmin, Charles F.,	Boston.	Tolman, Benjamin,	Concord.
Shorey, John L.,	Lynn.	Tolman, Miss H. S.,	Boston.
Skinner, Francis,	Boston.	Torrey, Everett,	Charlestown.
Slack, Charles W.,	"	Turner, John M.,	Dorchester.
Smith, Benjamin G.,	Cambridge.	Turner, Roswell W.,	Boston.

Turner, Royal W.,	Randolph.	Wheelwright, A. C.,	Boston.
		Whipple, John A.,	"
Underwood, Guy C.,	Boston.	Whitcomb, Wm. B.,	Medford.
Upham, Henry,	Brookline.	White, Benjamin C.,	Boston.
		White, Edward A.,	"
Vass, William J.,	Brookline.	White, Francis A.,	Brookline.
Vose, Benjamin C.,	Hyde Park.	Whitely, Edward,	Cambridge.
		Whiting, Nathaniel,	Brookline.
Wainwright, Wm. L.,	Braintree.	Whitmore, C. O.,	Boston.
Wakefield, E. H.,	Chelsea.	Whittle, George W.,	Somerville.
Walcott, Edward,	Pawtucket.	Whytal, Thomas G.,	New York, N.Y.
Walcott, Henry P.,	Cambridge.	Wilbur, G. B.,	Watertown.
Wales, George O.,	Braintree.	Wilcutt, Levi L.,	West Roxbury.
Walker, Edw. C. R.,	Dedham.	Wilder, Edw. Baker,	Dorchester.
Walker, Samuel A.,	"	Wilder, Henry A.,	Boston.
Walker, T. W.,	Waltham.	Wilder, Marshall P.,	Dorchester.
Walley, Mrs. W. P.,	Boston.	Willard, E. W.,	Newport, R. I.
Ward, John,	Newton.	Williams, Aaron D.,	Boston.
Wardwell, W. H.,	Newton Centre.	Williams, Benj. B.,	"
Ware, Benjamin P.,	Beach Bluff.	Williams, Philander,	Taunton.
Warren, George W.,	Boston.	Willis, George W.,	Chelsea.
Washburn, Andrew,	Hyde Park.	Willis, J. C.,	Boston.
Wason, Elbridge,	Brookline.	Wilson, Henry W.,	South Boston.
Waters, Edwin F.,	Newton Centre.	Wilson, Wm. Power,	Boston.
Watts, Isaac,	Newton.	Winship, F. Lyman,	Brighton.
Webber, Aaron D.,	Belmont.	Woerd, Charles V.,	Waltham.
Weld, Aaron D.,	Boston.	Woerd, C. V., Jr.,	"
Weld, George W.,	Newport, R. I.	Wood, Luke H.,	Marlborough.
Weld, Dr. Moses W.,	West Roxbury.	Wood, R. W.,	Jamaica Plain.
Weld, Richard H.,	Boston.	Wood, William K.,	West Newton.
Weld, William G.,	"	Woods, Henry,	Dorchester.
West, Mrs. Maria L.,	Brookline.	Woodward, Royal,	Brookline.
Weston, Leonard W.,	Lincoln.	Wright, George C.,	West Acton.
Weston, Seth,	Revere.	Wrisley, Frank,	New York, N.Y.
Wetherell, Leander,	Boston.		

ANNUAL MEMBERS.

Abbott, S. L., M. D.,	Boston.	Burley, Edward,	Beverly.
Adams, C. S.,	Framingham.	Burr, Charles C.,	Newton.
Allen, Andrew F.,	Arlington.	Butler, Edward,	Wellesley
Allen, Calvin,	Boston.		
Allen, C. L.,	GardenCity,N.Y.	Capen, Aaron D.,	Mattapan.
Ames, R. W.,	Boston.	Carter, Maria E.,	Woburn.
Anderson, Charles J.,	Longwood.	Cartwright, James,	Wellesley.
Atkinson, Chas. M.,	Brookline.	Chadbourne, M. W.,	Watertown.
Atkinson, Edward,	"	Chaffin, John C.,	Newton.
Atkinson, W. B.,	Newburyport.	Chapin, Gardner S.,	Arlington.
		Chapin, George H.,	Watertown.
Bacon, Augustus,	Boston.	Chase, Joseph S.,	Malden.
Bacon, William,	"	Cheney, Amos P.,	South Natick.
Badlam, William H.,	Dorchester.	Clark, James W.,	Framingham.
Bard, James,	Framingham.	Clark, Joseph,	Manchester.
Barker, John G.,	Lynn.	Clark, Joseph W.,	Dedham.
Batchelder, G. W.,	Dorchester.	Cobb, Jonathan H.,	"
Beard, Edward L.,	Cambridge.	Coe, Henry F.,	West Roxbury.
Beebe, J. Arthur,	Boston.	Collins, Frank S.,	Malden.
Beer, Carl,	Groton.	Comley, James,	Lexington.
Bird, John L.,	Dorchester.	Cox, James F.,	Abington.
Bliss, B. K.,	New York.	Crafts, William A.,	Boston.
Bock, William A.,	No. Cambridge.	Crosby, J. Allen,	Jamaica Plain.
Bolles, Matthew,	Boston.	Cruickshanks, J. T.,	Natick.
Bolles, William P.,	"	Curtis, Daniel T.,	Boston.
Bolton, John B.,	Somerville.	Curtis, Joseph H.,	"
Boott, William,	Boston.		
Bottomly, Robert,	Belmont.	Darling, Moses, Jr.,	South Boston.
Bowditch, E. Francis,	Framingham.	Davenport, A. M.,	Watertown.
Bowditch, James H.,	Brookline.	Davis, Frederick,	Newton.
Bradlee, John T.,	Boston.	Davis, Thomas M.,	Cambridgeport.
Breck, Charles H.,	Brighton.	Demar, John A.,	Lexington.
Breck, Charles H. B.,	"	Dolbear, Mrs. Alice J.,	Somerville.
Brooks, George,	Brookline.	Doogue, William,	Boston.
Brown, A. S.,	Jamaica Plain.	Duffley, Daniel,	Brookline.
Brown, Atherton T.,	Boston.	Dunn, Thomas,	Newport, R. I.
Brown, Benjamin F.,	Charlestown.	Dupee, James A.,	Brookline.
Brown, Jona., Jr.,	Somerville.		
Brown, Joseph T.,	Boston.	Eaton, Jacob,	Cambridgeport.
Bullard, George B.,	Hingham.	Edgar, William,	Newtonville.

Falconer, John,	Rochester.
Falconer, William,	Glencove, N.Y.
Farrier, Mrs. C.,	Stoneham.
Faxon, Edwin,	Jamaica Plain.
Faxon, M. B.,	Melrose.
Felton, Arthur W.,	West Newton.
Fenno, Warren,	Revere.
Fisher, Sewall,	Framingham.
Fletcher, Edwin,	Acton.
Foster, Joshua T.,	Medford.
Fowle, Charles L.,	Dorchester.
Fowle, George W.,	Jamaica Plain.
French, William E.,	Boston.
Frohock, Roscoe R.,	Malden.
Frost, George,	West Newton.
Frost, Stiles,	Boston.
Fuller, T. Otis,	Needham.
Gane, Henry A.,	West Newton.
Gardiner, Claudius B.,	Newburyport.
Gardner, John,	Boston.
Garfield, Charles,	Medford.
Gaut, Samuel N.,	Somerville.
Gilbert, John,	Boston.
Gilbert, Samuel,	"
Gilbert, W. A.,	Neponset.
Gill, Mrs. E. M.,	Medford.
Gleason, Herbert,	Malden.
Godbold, G. A.,	Chelsea.
Goddard, Thomas,	Boston.
Goodwin, Lester,	Brighton.
Gould, William P.,	Jamaica Plain.
Grant, Charles E.,	Concord.
Gray, Howard,	Dorchester.
Gray, William, Jr.,	"
Gray, William, 3d,	"
Greene, Malcolm C.,	"
Grew, Henry,	Hyde Park.
Grover, William O.,	Boston.
Guerineau, Louis,	Malvern, Ark.
Hall, William T.,	Revere.
Hamlin, Delwin A.,	South Boston.
Harris, Miss Ellen M.,	Jamaica Plain.
Harris, Frederick L.,	South Natick.
Hartwell, Samuel,	Lincoln.
Harwood, George S.,	Newton.
Hatch, Samuel,	Boston.
Hayes, John L.,	Cambridge.
Hayward, George P.,	Hingham.
Hazleton, H. L.,	Boston.
Hersey, Alfred H.,	Hingham.
Hersey, Edmund,	"
Heustis, Warren,	Belmont.
Hewins, James,	Medfield.
Hews, Albert H.,	No. Cambridge.
Hill, Benjamin D.,	Peabody.
Hill, Miss Katie A.,	Lowell.
Hinckley, Mrs. D. F.,	Chelsea.
Howe, Rufus,	Marlborough.
Ireland, George W.,	Somerville.
Jameson, G. W.,	East Lexington.
Jones, Moses,	Brookline.
Jordan, Samuel,	Yarmouth.
Judkins, Rev. B.,	West Dedham.
Kelley, George B.,	Jamaica Plain.
Kelsey, Fred W.,	Waverly, N. Y.
Kendall, Jonas,	Framingham.
Kennard, Martin P.,	Brookline.
Kenrick, Miss A. C.,	Newton.
Lamprell, Simon,	Marblehead.
Lang, John H. B.,	Dorchester.
Langmaid, Mrs. Mary,	Somerville.
Langworthy, Rev. I. P.,	Chelsea.
Leavens, E. W.,	Malden.
Lee, Charles J.,	Dorchester.
Lee, Francis H.,	Salem.
Livermore, Miss M.,	Mount Auburn.
Loring, Charles G.,	Boston.
Loring, John A.,	"
Lothrop, David W.,	West Medford.
Lothrop, H. A.,	Sharon.
Lothrop, Thornton K.,	Boston.
Lowell, John,	Newton.
Marcou, Mrs. J.,	Cambridge.
Markoe, G. F. H.,	Boston.
May, F. W. G.,	Boston.
McDermott, Andrew,	"
McIntosh, A. S.,	"

McLaren, Anthony,	Forest Hills.	Safford, Nathaniel F.,	Milton.
Mellen, George M.,	Brookline.	Saunders, Miss M.T.,	Salem.
Meriam, Dr. H. C.,	Salem.	Saville, George,	Quincy.
Merrill, J. Warren,	Cambridgeport.	Sawtell, J. M.,	Fitchburg.
Merrill, S. A.,	Wollaston.	Schlegel, Adam,	Boston.
Mills, William,	Somerville.	Schmitt, Georg A.,	Brookline.
Minton, Peter J.,	Forest Hills.	Scott, A. E.,	Lexington.
Morandi, Francis,	Malden.	Scott, George H.,	Allston.
Morandi, Francis W.,	"	Scudder, Samuel H.,	Cambridge.
Morton, James H.,	Boston.	Shattuck, F. R.,	Boston.
Murray, Daniel D.,	Brookline.	Shedd, Abraham B.,	Lexington.
Muzzey, Rev. A. B.,	Cambridge.	Shedd, Arthur B.,	Chicago, Ill.
		Sheppard, Edwin,	Lowell.
Nightingale, Crawford,	Dorchester.	Sheppard, S. A. D.,	Newton.
Norton, Michael H.,	Boston,	Simpson, Michael H.,	Saxonville.
Norton, Patrick,	"	Snow, Eugene A.,	Melrose.
		Southworth, Edward,	Quincy.
O'Brien, James,	Jamaica Plain.	Spooner, William H.,	Jamaica Plain.
		Sprague, Charles J.,	Boston.
Park, William D.,	Boston.	Squire, John P.,	Arlington.
Parker, John,	"	Starbird, Louis D.,	Malden.
Parsons, William,	"	Stevenson, Hamilton,	Woburn.
Patterson, James,	Cambridge.	Stone, Eliphalet,	Dedham.
Payson, Samuel R.,	Boston.	Stone, Samuel G.,	Charlestown.
Phillips, Nathaniel,	Dorchester.	Storer, Charles,	Natick.
Pickering, Mrs. E.C.,	Cambridge.	Story, Miss Sarah W.,	Brighton.
Pierce, Samuel H.,	Lincoln.	Strahan, Thomas, Jr.,	Chelsea.
Plimpton, W. P.,	West Newton.	Sullivan, J. L. D.,	Somerville.
Power, Charles J.,	S. Framingham.	Swan, Charles W.,	Boston.
Pratt, Mrs. Mary L.,	Hingham.		
Prince, Thomas,	Boston.	Tailby, Joseph,	Wellesley.
Purdie, George A.,	Wellesley Hills.	Talbot, Josiah W.,	Norwood,
Putnam, Charles A.,	Salem.	Tapper, Thomas,	Canton.
Putnam, Henry W.,	"	Terwilliger, S. F.,	Saratoga, N. Y.
		Tobey, Miss M. B.,	Brookline,
Randall, Macey,	Sharon.	Torrey, Bradford,	Boston.
Ranlett, S. A.,	Melrose.	Trautman, Martin,	"
Richards, John S.,	Brookline.	Turner, Nathaniel W.	"
Richardson, E. P.,	Lawrence.		
Richardson, Horace,	Framingham.	Underwood, Wm. J.,	Belmont.
Richardson, S. W.,	Boston.		
Ridler, Charles E.,	Kingston.	Van der Veur, P. W.,	New York, N.Y.
Roberts, Edward,	Hyde Park.	Vaughan, J. C.,	Chicago, Ill.
Rogers, John F.,	Cambridge.		
Ross, Charles W.,	Newtonville.	Walker, Charles H.,	Chelsea.
		Walker, Joseph T.,	Boston.
Safford, Fred'k M.,	Dorchester.	Walker, William P.,	Somerville.

Waterer, Hosea,	South Natick.	Wilmarth, Henry D.,	Jamaica Plain.
Webster, John,	Salem.	Wilson, B. Osgood,	Watertown.
Weld, Francis M.,	Jamaica Plain.	Wilson, George W.,	Malden.
Wellington, Jos. V.,	Cambridge.	Wiswall, Henry M.,	Watertown.
Wells, Benjamin T.,	Boston.	Withington, Henry H.,	Jamaica Plain.
Weston, Mrs. L. P.,	Danvers.	Wolcott, Mrs. H. L. T.,	Boston.
Wheatland, Henry,	Salem.	Wood, Mrs. Anna D.,	West Newton.
Wheeler, Miss Ann C.,	Cambridgeport.	Wood, E. W.,	" "
Wheildon, Wm. W.,	Concord.	Woodford, Jos. H.,	Newton.
White, Nelson B.,	Norwood.	Woolson, George C.,	Passaic, N. J.
Whitney, Joel,	Winchester.	Wright, Daniel,	Lowell.
Whiton, Starkes,	Hingham Centre.		
Wilde, Hiram,	Randolph.	Zirngiebel, Denys,	Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXVI. — Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments; and any member having once paid an admission fee, may become a Life Member by the payment of twenty dollars in addition thereto.

SECTION XXVII. — Admission Fee and Annual Assessment.

Every subscription member, before he receives his Diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIX. — Discontinuance of Membership.

Any member who shall neglect for the space of two years to pay his annual assessment, shall cease to be a member of the Society, and the Treasurer shall erase his name from the List of Members.

The attention of Annual Members is particularly called to Section XXIX.

HONORARY MEMBERS.

A * denotes the member deceased. Correspondents of the Society and others will confer a favor by communicating to the Secretary information of the decease, change of residence, etc., of Honorary or Corresponding Members.

*Benjamin Abbott, LL. D., Exeter, N. H.

*John Abbott, Brunswick, Me.

*Hon. John Quincy Adams, LL. D., late President of the United States, Quincy.

*Professor Louis Agassiz, Cambridge.

*William T. Aiton, late Curator of the Royal Gardens, Kew, England.

*Thomas Allen, late President of the St. Louis Horticultural Society, St. Louis, Mo., and Pittsfield, Mass.

*Hon. Samuel Appleton, Boston.

*Hon. James Arnold, New Bedford.

*Edward Nathaniel Bancroft, M. D., late President of the Horticultural and Agricultural Society of Jamaica.

*Hon. Philip P. Barbour, Virginia.

*Don Angel Calderon de la Barca, late Spanish Minister at Washington.

*Robert Barclay, Bury Hill, Dorking, Surrey, England.

*James Beekman, New York.

*L'Abbe Berlèse, Paris.

*Nicholas Biddle, Philadelphia.

*Dr. Jacob Bigelow, Boston.

*Mrs. Lucy Bigelow, Medford.

*Le Chevalier Soulange Bodin, late Secrétaire Général de la Société d'Horticulture de Paris.

Hon. George S. Boutwell, Groton.

*Josiah Bradlee, Boston.

*Hon. George N. Briggs, Pittsfield.

*Hon. James Buchanan, late President of the United States, Lancaster, Penn.

*Jesse Buel, late President of the Albany Horticultural Society, Albany, N. Y.

*Hon. Edmund Burke, late Commissioner of Patents, Washington, D. C.

*Augustin Pyramus de Candolle, Geneva, Switzerland.

Hon. Horace Capron, Ex-U. S. Commissioner of Agriculture, Washington, D. C.

*Commodore Isaac Chauncey, U. S. Navy, Brooklyn, N. Y.

*Ward Chipman, late Chief Justice of New Brunswick, St. John.
*Lewis Clapier, Philadelphia.
*Hon. Henry Clay, Lexington, Ky.
H. W. S. Cleveland, Chicago, Ill.
*Admiral Sir Isaac Coffin, Bart., England.
*Zaccheus Collins, late President of the Pennsylvania Horticultural Society, Philadelphia.
*Roswell L. Colt, Paterson, N. J.
Caleb Cope, Ex-President of the Pennsylvania Horticultural Society, Philadelphia.
*William Coxe, Burlington, N. J.
*John P. Cushing, Watertown.
*Charles W. Dabney, late U. S. Consul, Fayal, Azores.
*Hon. John Davis, LL. D., Boston.
*Sir Humphry Davy, London.
*Gen. Henry Alexander Scammel Dearborn, Roxbury.
*James Dickson, late Vice-President of the Horticultural Society of London.
*Mrs. Dorothy Dix, Boston.
*Capt. Jesse D. Elliot, U. S. Navy.
*Hon. Stephen Elliot, LL. D., Charleston, S. C.
*Hon. Henry L. Ellsworth, late Commissioner of Patents, Washington, D. C.
*Allyn Charles Evanson, late Secretary of the King's County Agricultural Society, St. John, N. B.
*Hon. Edward Everett, LL. D., Boston.
*Hon. Horace Everett, Vermont.
*F. Faldermann, late Curator of the Imperial Botanic Garden, St. Petersburg.
*Hon. Millard Fillmore, late President of the United States, Buffalo, N. Y.
*Dr. F. E. Fischer, late Professor of Botany at the Imperial Botanic Garden, St. Petersburg.
*Hon. Theodore Frelinghuysen, late President of the American Agricultural Society, New Brunswick, New Jersey.
*Joseph Gales, Jr., late Vice-President of the Horticultural Society, Washington, D. C.
*George Gibbs, New York.
*Stephen Girard, Philadelphia.
*Hon. Robert T. Goldsborough, Talbot County, Maryland.
*Ephraim Goodale, South Orrington, Maine.
*Mrs. Rebecca Gore, Waltham.
*Hon. John Greig, late President of the Domestic Horticultural Society, Canandaigua, N. Y.
*Mrs. Mary Griffith, Charlies Hope, N. J.
*Gen. William Henry Harrison, late President of the United States, North Bend, Ohio.
*S. P. Hildreth, M. D., Marietta, Ohio.
*Thomas Hopkirk, late President of the Glasgow Horticultural Society.
*David Hosack, M. D. late President of the New York Horticultural Society.

*Lewis Hunt, Huntsburg, Ohio.
*Joseph R. Ingersoll, late President of the Pennsylvania Horticultural Society, Philadelphia.
*Gen. Andrew Jackson, late President of the United States, Nashville, Tenn.
*Mrs. Martha Johonnot, Salem.
*Jared Potter Kirtland, M. D., LL. D., East Rockport, Ohio.
*Thomas Andrew Knight, late President of the Horticultural Society of London.
*Gen. La Fayette, La Grange, France.
*Le Comte De Lasteyrie, late Vice-President of the Horticultural Society of Paris.
L. A. H. Latour, M. P., Montreal, Canada.
*Baron Justus Liebig, Giessen, Germany.
*Prof. John Lindley, late Secretary of the Horticultural Society of London.
Franklin Litchfield, U. S. Consul at Puerto Cabello, Venezuela.
*Joshua Longstreth, Philadelphia.
*Nicholas Longworth, Cincinnati, Ohio.
*Jacob Lorillard, late President of the New York Horticultural Society.
*John C. Loudon, London.
*Hon. John A. Lowell, Boston.
*Baron Charles Ferdinand Henry Von Ludwig, late Vice-President of the South African Literary and Scientific Institution, Cape Town, Cape of Good Hope.
*Hon. Theodore Lyman, Brookline.
Col. Theodore Lyman, Brookline.
*Hon. James Madison, late President of the United States, Montpelier, Va.
*Mrs. Charlotte Marryatt, Wimbledon, near London.
Joseph Maxwell, Rio Janeiro.
D. Smith McCauley, U. S. Consul-General, Tripoli.
*Hon. Isaac McKim, late President of the Horticultural Society of Maryland, Baltimore.
Rev. James H. Means, Dorchester, Mass.
*James Mease, M. D., Philadelphia.
*Lewis John Mentens, Brussels, Belgium.
*Hon. Charles F. Mercer, Virginia.
*François André Michaux, Paris.
Donald G. Mitchell, New Haven, Conn.
*Samuel L. Mitchill, M. D., LL. D., New York.
*Hon. James Monroe, late President of the United States, Oak Hill, Va.
*Alfred S. Monson, M. D., late President of the New Haven Horticultural Society, New Haven, Conn.
*Hon. A. N. Morin, Montreal, Canada.
*Théodore Mosselmann, Antwerp, Belgium.
Baron R. Von Osten Sacken, Heidelberg, Germany.
Baron Ottenfels, Austrian Minister to the Ottoman Porte.
John Palmer, Calcutta.

*Hon. Joel Parker, LL. D., Cambridge.
Samuel B. Parsons, Flushing, N. Y.
*Hon. Thomas H. Perkins, Brookline.
*A. Poiteau, late Professor in the Institut Horticole de Fromont.
*Hon. James K. Polk, late President of the United States, Nashville, Tenn.
*John Hare Powel, Powelton, Pa.
*Henry Pratt, Philadelphia.
*William Prince, Flushing, N. Y.
*Rev. George Putnam, D. D., Roxbury.
*Col. Joel Rathbone, late President of the Albany and Rensselaer Horticultural Society, Albany, N. Y.
*Archibald John, Earl of Roseberry, late President of the Caledonian Horticultural Society.
*Joseph Sabine, late Secretary of the Horticultural Society of London.
*Don Ramon de la Sagra, Havana, Cuba.
*Henry Winthrop Sargent, Fishkill, N. Y.
*Sir Walter Scott, Abbotsford, Scotland.
*John Shepherd, late Curator of the Botanic Garden, Liverpool, England.
*John S. Skinner, late Editor of the American Farmer, Baltimore, Md.
George W. Smith, Boston.
*Stephen H. Smith, late President of the Rhode Island Horticultural Society.
*Hon. Charles Sumner, Boston.
*Hon. John Taliaferro, Virginia.
*Gen. James Talmadge, late President of the American Institute, N. Y.
*Gen. Zachary Taylor, late President of the United States, Baton Rouge, La.
*James Thacher, M. D., Plymouth.
John J. Thomas, Union Springs, N. Y.
*James W. Thompson, M. D., Wilmington, Del.
*Grant Thorburn, New York.
*M. Du Petit Thouars, Paris.
*Le Vicomte Héricart de Thury, late President of the Horticultural Society of Paris.
*Mons. Tougard, late President of the Horticultural Society of Rouen, France.
*Gen. Nathan Towson, late President of the Horticultural Society, Washington, D. C.
*Hon. John Tyler, late President of the United States, Williamsburg, Va.
*Rev. Joseph Tyso, Wallingford, England.
*Hon. Martin Van Buren, late President of the United States, Kinderhook, N. Y.
*Federal Vanderburg, M. D., New York.
*Jean Baptiste Van Mons, M. D., Brussels, Belgium.
*Gen. Stephen Van Rensselaer, Albany, N. Y.
*Joseph R. Van Zandt, Albany, N. Y.
*Benjamin Vaughan, M. D., Hallowell, Me.
*Petty Vaughan, London.

*Rev. N. Villeneuve, Montreal, Canada.
*Pierre Philippe André Vilmorin, Paris.
*James Wadsworth, Geneseo, N. Y.
*Nathaniel Wallich, M. D., late Curator of the Botanic Garden, Calcutta.
*Malthus A. Ward, M. D., late Professor in Franklin College, Athens, Ga.
*Hon. Daniel Webster, Marshfield.
*Hon. John Welles, Boston.
*Jeremiah Wilkinson, Cumberland, R. I.
Hon. Robert C. Winthrop, Boston.
*Frederick Wolcott, Litchfield, Conn.
*Ashton Yates, Liverpool, England.
*Lawrence Young, late President of the Kentucky Horticultural Society, Louisville.

CORRESPONDING MEMBERS.

A * denotes the members deceased.

*John Adlum, Georgetown, D. C.
*Don Francisco Aguilar y Leal, U. S. Vice-Consul at Maldonado, Banda Oriental del Uruguay.
*Mons. Alfroy, Lieusaint, France.
James T. Allan, Ex-President of the Nebraska State Horticultural Society, Omaha, Neb.
A. B. Allen, New York.
*Rev. Thomas D. Anderson, D.D., South Boston.
*Thomas Appleton, late U. S. Consul at Leghorn, Italy.
*Col. Thomas Aspinwall, late U. S. Consul at London, Brookline.
P. M. Augur, State Pomologist, Middlefield, Conn.
*Isaac Cox Barnet, late U. S. Consul at Paris.
Patrick Barry, Ex-Chairman of the General Fruit Committee of the American Pomological Society, Rochester, N. Y.
*Augustine Baumann, Bolwiller, Alsace.
*Eugéne Achille Baumann, Rahway, N. J.
*Joseph Bernard Baumann, Bolwiller, Alsace.
Napoleon Baumann, Bolwiller, Alsace.
D. W. Beadle, St. Catherine's, Ontario.
Professor W. J. Beal, Lansing, Michigan.
*Noel J. Becar, Brooklyn, N. Y.
*Edward Beck, Worton College, Isleworth, near London.
Rev. Henry Ward Beecher, Peekskill, N. Y.
*Louis Édouard Berckmans, Rome, Ga.
Prosper J. Berckmans, Augusta, Ga.
*Alexander Bivort, late Secretary of the Société Van Mons, Fleurus, Belgium.
*Tripet Le Blanc, Paris.
*Charles D. Bragdon, Pulaski, Oswego Co., N. Y.
*William D. Brinckle, M. D., Philadelphia.
*George Brown, late U. S. Commissioner to the Sandwich Islands, Beverly.
*John W. Brown, Fort Gaines, Ga.
*Dr. Nehemiah Brush, East Florida.
*Arthur Bryant, Sr., late President of the Illinois State Horticultural Society, Princeton, Ill.
*Robert Buist, Philadelphia.
*Dr. E. W. Bull, Hartford, Conn.
William Bull, Chelsea, England.

Rev. Robert Burnet, Ex-President of the Ontario Fruit Growers' Association, Pictou, N. S.
Alexander Burton, United States Consul at Cadiz, Spain.
Isidor Bush, Bushberg, Jefferson Co., Mo.
George W. Campbell, Delaware, Ohio.
*Francis G. Carnes, New York.
*Col. Robert Carr, Philadelphia.
*Rev. John O. Choules, D. D., Newport, R. I.
*Rev. Henry Colman, Boston.
*James Colvill, Chelsea, England.
Benjamin E. Cotting, M. D., Boston.
*Samuel L. Dana, M. D., Lowell.
*J. Decaisne, late Professeur de Culture au Muséum d'Histoire Naturelle, Jardin des Plantes, Paris.
*James Deering, Portland, Me.
*H. F. Dickehut.
*Sir C. Wentworth Dilke, Bart., London.
*Hon. Allen W. Dodge, Hamilton.
Rev. H. Honywood D'Ombrain, Westwell Vicarage, Ashford, Kent, England.
*Andrew Jackson Downing, Newburg, N. Y.
Charles Downing, Newburg, N. Y.
Parker Earle, Cobden, Ill.
*F. R. Elliott, late Secretary of the American Pomological Society, Cleveland, Ohio.
George Ellwanger, Rochester, N. Y.
*George B. Emerson, LL. D., Winthrop.
*Ebenezer Emmons, M. D., Williamstown.
*Andrew H. Ernst, Cincinnati, O.
*Nathaniel Fellows, Cuba.
*Henry J. Finn, Newport, R. I.
*W. C. Flagg, late Secretary of the American Pomological Society, Moro, Ill.
*Michael Floy, late Vice-President of the New York Horticultural Society, New York City.
*John Fox, Washington, D. C.
*Hon. Russell Freeman, Sandwich.
Andrew S. Fuller, Ridgewood, N. J.
Henry Weld Fuller, Roxbury.
Hon. Robert W. Furnas, President of the Nebraska State Horticultural Society, Brownville, Neb.
*Augustin Gande, late President of the Horticultural Society, Department of Sarthe, France.
*Robert H. Gardiner, Gardiner, Me.
*Benjamin Gardner, late U. S. Consul at Palermo, Sicily.
*Capt. James T. Gerry, U. S. Navy.
*Abraham P. Gibson, late U. S. Consul at St. Petersburg.
*R. Glendinning, Chiswick, near London.

PROFESSOR GEORGE L. GOODALE, Cambridge.
CHARLES W. GORDON, U. S. Consul at Rio Janeiro.
PROFESSOR ASA GRAY, Cambridge.
O. B. HADWEN, Ex-President of the Worcester County Horticultural Society, Worcester.
*CHARLES HENRY HALL, New York.
*ABRAHAM HALSEY, late Corresponding Secretary of the New York Horticultural Society, New York.
*DR. CHARLES C. HAMILTON, late President of the Fruit Growers' Association and International Show Society of Nova Scotia, Canard.
*REV. THADDEUS MASON HARRIS, D. D., Dorchester.
*THADDEUS WILLIAM HARRIS, M. D., Cambridge.
*JOHN HAY, late Architect of the Caledonian Horticultural Society.
*BERNARD HENRY, late U. S. Consul at Gibraltar, Philadelphia.
SHIRLEY HIBBERD, Editor of the Gardener's Magazine, London.
*J. J. HITCHCOCK, Baltimore.
ROBERT HOGG, LL. D., Editor of the Journal of Horticulture, London.
*THOMAS HOGG, New York.
THOMAS HOGG, New York.
J. C. HOLDING, Ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.
REV. S. REYNOLDS HOLE, Caunton Manor, Newark, Nottinghamshire, England.
FISHER HOLMES, Sheffield, England.
SIR JOSEPH HOOKER, K. C. S. I., Director of the Royal Botanic Garden, Kew, England.
JOSIAH HOOPES, West Chester, Penn.
PROFESSOR E. N. HORSFORD, Cambridge.
*SANFORD HOWARD, Chicago, Ill.
*DR. WILLIAM M. HOWSLEY, late President of the Kansas State Horticultural Society, Leavenworth.
*ISAAC HUNTER, Baltimore, Md.
*ISAAC HURD, Cincinnati, Ohio.
GEORGE HUSMANN, Napa, Cal.
*PROFESSOR ISAAC W. JACKSON, Union College, Schenectady, N. Y.
*THOMAS P. JAMES, Cambridge.
EDWARD JARVIS, M. D., Dorchester.
J. W. P. JENKS, Middleborough.
WILLIAM J. JOHNSON, M. D., Fort Gaines, Ga.
SAMUEL KNEELAND, M. D., Boston.
*MONS. LAFFAY, St. Cloud, near Paris, France.
*DAVID LANDRETH, late Corresponding Secretary of the Pennsylvania Horticultural Society, Bristol, Pa.
C. C. LANGDON, Mobile, Alabama.
*DR. WILLIAM LEBARON, late State Entomologist, Geneva, Ill.
G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.

*E. S. H. Leonard, M. D., Providence, R. I.
*André Leroy, Author of the Dictionnaire de Pomologie, Angers, France.
J. Linden, Ghent, Belgium.
Hon. George Lunt, Scituate.
*F. W. Macondray, San Francisco, Cal.
*James J. Mapes, LL. D., Newark, N. J.
*A. Mas, late President of the Horticultural Society, Bourg-en-Bresse, France.
Dr. Maxwell T. Masters, Editor of the Gardeners' Chronicle, London.
*James Maury, late U. S. Consul at Liverpool, England.
T. C. Maxwell, Geneva, N. Y.
*William Sharp McLeay, New York.
*James McNab, late Curator of the Botanic Garden, Edinburgh, Scotland.
Thomas Meehan, Editor of the Gardener's Monthly, Germantown, Pa.
*Allan Melvill, New York.
*John Miller, M. D., late Secretary of the Horticultural and Agricultural Society of Jamaica.
*Stephen Mills, Flushing, N. Y.
*Charles M'Intosh, Dalkeith Palace, near Edinburgh.
J. E. Mitchell, Philadelphia.
*Giuseppe Monarchini, M. D., Canea, Isle of Candia.
Édouard Morren, Editor of the Belgique Horticole, Liége, Belgium.
*Horatio Newhall, M. D., Galena, Ill.
*David W. Offley, late U. S. Consular Agent, Smyrna, Turkey.
James Ombrosi, U. S. Consul, Florence, Italy.
*John J. Palmer, New York.
*Victor Paquet, Paris.
*John W. Parker, late U. S. Consul at Amsterdam, Holland.
*André Parmentier, Brooklyn, N. Y.
William Paul, Waltham Cross, London, N.
*Sir Joseph Paxton, M. P., Chatsworth, England.
*John L. Payson, late U. S. Consul at Messina, Sicily.
*Com. Matthew C. Perry, U. S. Navy, Charlestown.
*David Porter, late U. S. Chargé d' Affaires at the Ottoman Porte, Constantinople.
*Alfred Stratton Prince, Flushing, N. Y.
*William Robert Prince, Flushing, N. Y.
P. T. Quinn, Newark, N. J.
Rev. Rushton Radclyffe, London, England.
*William Foster Redding, Baltimore, Md.
D. Redmond, Ocean Springs, Miss.
Dr. S. Reynolds, Schenectady, N. Y.
*John H. Richards, M. D., Illinois.
Charles V. Riley, Entomologist to the U. S. Department of Agriculture, Washington, D. C.
*Mons. J. Rinz, Jr., Frankfort-on-the-Main, Germany.
*Thomas Rivers, Sawbridgeworth, Herts, England.
William Robinson, Editor of The Garden, London.

*Bernhard Roeser, M. D., Bamberg, Bavaria.
*Dr. J. Smyth Rogers, New York.
*Capt. William S. Rogers, U. S. Navy.
*Thomas Rotch, Philadelphia.
*George R. Russell, Roxbury.
John B. Russell, Newmarket, N. J.
*Rev. John Lewis Russell, Salem.
William Saunders, Department of Agriculture, Washington, D. C.
*William Shaler, late U. S. Consul-General at Havana, Cuba.
*William Shaw, New York.
*Caleb R. Smith, Burlington, N. J.
*Daniel D. Smith, Burlington, N. J.
*Gideon B. Smith, late Editor of the American Farmer, Baltimore, Md.
*John Jay Smith, Germantown, Penn.
*Horatio Sprague, late U. S. Consul at Gibraltar.
Robert W. Starr, Port William, Nova Scotia.
Dr. Joseph Stayman, Leavenworth, Kansas.
*Capt. Thomas Holdup Stevens, U. S. Navy, Middletown, Conn.
William Fox Strangeway, British Secretary of Legation at Naples, Italy.
Dr. J. Strentzel, Martinez, Cal.
*Judge E. B. Strong, Rochester, N. Y.
*James P. Sturgis, Canton, China.
William Summer, Pomaria, S. C.
Francis Summerest.
*Prof. Michele Tenore, late Director of the Botanic Garden at Naples, Italy.
*James Englebert Teschemacher, Boston.
*Robert Thompson, Chiswick, near London.
*George C. Thorburn, New York.
Prof. George Thurber, Editor of the American Agriculturist, New York.
*John Tilson, Jr., Edwardsville, Illinois.
*Cav. Doct. Vincenzo Tineo, Director of the Botanic Garden at Palermo.
*Luther Tucker, Editor of the Cultivator, Albany, N. Y.
*Carey Tyso, Wallingford, England.
*Louis Van Houtte, Ghent, Belgium.
*Alexander Vattemare, Paris.
*Emilien de Wael, late Secretary of the Horticultural Society, Antwerp, Belgium.
*John A. Warder, M. D., late President of the Ohio State Horticultural Society, North Bend.
Anthony Waterer, Knapp Hill, near Woking, Surrey, England.
*J. Ambrose Wight, Editor of the Prairie Farmer, Chicago, Ill.
Benjamin Samuel Williams, Holloway, London, N.
Professor John Wilson, Edinburgh University, Scotland.
*William Wilson, New York.
*Hon. J. F. Wingate, Bath, Me.
*Gen. Joshua Wingate, Portland, Me.
*Joseph Augustus Winthrop, Charleston, S. C.

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A HISTORY

OF

AMERICAN HORTICULTURE.

The attention of Trustees and Librarians of Public Libraries, and of Horticulturists generally, is called to the History of the Massachusetts Horticultural Society, for fifty years, from its foundation in 1829. This work will be found of general interest, as the introduction comprises a sketch, much fuller than exists elsewhere, of the History of Horticulture in the United States, from the settlement of the country to the foundation of the Society, and the history of the Society onward is, in the language of President Hovey, in his address at the dedication of the present Hall of the Society, "the History of Horticulture in our country." It is handsomely printed, on an extra quality of paper, and embellished with a fine steel engraving of Gen. H. A. S. Dearborn, the first President, and heliotypes of the two Halls erected by the Society. Among other interesting matters, it contains an account of the foundation by the Society of Mount Auburn Cemetery, the parent of all similar cemeteries in the country.

The work is furnished to members of the Society, at cost, $2.50, and to others than members for $3, but will be supplied to public libraries and booksellers at the same price as to members. Please address the Secretary of the Society, at Horticultural Hall, Boston.

ROBERT MANNING,

Secretary.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1884.

PART I.

BOSTON:
PRINTED FOR THE SOCIETY.
1885.

APR 2 1 1929

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The following papers and discussions have been circulated to some extent in the form of slips reprinted from the reports made by the Secretary of the Society in the Boston Transcript. As here presented, the papers are printed in full, and the discussions are not only fuller than in the weekly reports, but have been carefully revised by the speakers.

The Committee on Publication and Discussion take this opportunity to repeat what they have before stated, that the Society is not to be held responsible for the certainty of the statements, the correctness of the opinions, or the accuracy of the nomenclature in the papers and discussions now or heretofore published, all of which must rest on the credit or judgment of the respective writers or speakers, the Society undertaking only to present these papers and discussions, or the substance of them, correctly.

O. B. Hadwen,
William H. Hunt,
Francis H. Appleton,
Committee on Publication and Discussion.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, January 5, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

The President delivered his annual address, which was received with frequent applause, and, on motion of William H. Spooner, it was unanimously voted that the thanks of the Society be presented to the President for his able and interesting address, and that a copy be requested for publication.

ADDRESS OF PRESIDENT HAYES.

Extending to each other the kindly greetings of the season, we have assembled on this our anniversary to review the Society's work of the past year, to make such suggestions as our experience may dictate for advancement in the loved pursuits associated with this place, and to consider what we can do for increasing the usefulness of this institution and perpetuating it to the most distant generations.

While always recognizing with gratitude what has been accomplished in previous years, by this Society, we can look upon what has been done during the past year with peculiar satisfaction, as showing marked progress in our work. It is universally admitted by those best qualified to judge that never before have our discussions been so well conducted and so interesting as they have been for the past year. They have not only been well attended by our members, but many have come from a distance, as well as

from our neighborhood, to receive both instruction and pleasure in listening to distinguished proficients in horticulture, who can, from their rich experience, give that valuable information which can nowhere, in this country certainly, be obtained so well as in this hall. It is no small privilege to one interested in the cultivation of flowers, fruits, and vegetables to be permitted to hear able essays and discussions on horticultural subjects, and have, on his inquiry, the doubts and trouble which he meets with in his gardening resolved and removed as far as possible. Moreover, the weekly careful publication, by our Secretary, of the Society's proceedings benefits not only those who attend our meetings but the entire community in a very important manner, which service those interested in horticulture gratefully appreciate.

Our exhibitions of the past year have been remarkably good, considering the unpropitious season. They have been better attended by the public than they have been for many years, our exhibition receipts being $350.12 in excess of the previous year; and this success encourages our Society to put forth stronger inducements to make its exhibitions more varied, useful, and beautiful in the future.

The library has been enlarged, and such conveniences as were desirable for the protection of our valuable books and easy access to them have been procured.

All the committees of the Society have done their work faithfully and to the general satisfaction of our members.

The success of this Society depends very much upon the wisdom and labors of the Committee of Arrangements. We all cannot but appreciate the excellent service rendered by our associate, Charles H. B. Breck, who has filled the chair of this committee for the past sixteen years, and now when, at his request, he has been relieved from the discharge of those duties which he has long and ably performed, it is our good fortune to have another member, well qualified, fill the vacant chair, under whose earnest and vigorous administration, supported as he will be by the able associates of his committee, we hope and believe the progress of the Society will be continued and uninterrupted.

Our financial situation also is much improved. During the past four years, though the Society has expended large sums of money in repairing and improving its estate, in removing restrictions upon and remedying alleged defects in the title to its property, in paying during the past year about one thousand dollars as dam-

ages for the loss of a person's life on account of the fall of ice from the roof of our building, which the usual precautions taken by our Superintendent against such an accident could not prevent, and notwithstanding the increase of our taxes caused by an increase in the valuation, by the city assessors, of our property, we have yet been able to pay, during the past year, nine thousand dollars of our floating debt, and shall have the means of paying the remaining three thousand dollars of this debt at its maturity this month. We have also, during the past year, renewed our mortgage debt of sixty thousand dollars, reducing the annual interest from five and one-half to four and one-quarter per cent. for a period of five years. Thus the amount of annual interest has been reduced from what we paid four years ago, by $720, on the floating debt of $12,000, now paid, or provided for as above stated, and $750 per annum on our mortgage debt, showing a reduction of interest in all of $1,470, annually, from the present time.

We are now practically free from a floating debt, and it should be the aim of the Society to so husband its resources as not only to have on hand sufficient cash assets to meet contingencies, but to provide for the establishment of a fund from our savings which shall free us eventually from our mortgage debt, that we may in a few years hold our estate free of all incumbrances, and so transmit it to our successors.

But I would not advise such management of our property, or parsimony in our expenditures, as might impair the efficiency of our Society, and prevent stimulating by a judicious increase of our prize-list the growth of the useful and beautiful products of the earth; on the contrary, I think the increase we have lately made in the appropriations to various committees at the suggestion of the Committee on Establishing Prizes is eminently wise, and I trust there will be a gradual moderate increase made in future years to these appropriations according to our means, and such additional expenditures made from our income as good judgment will justify for augmenting the usefulness of our Society.

It will give me great pleasure to see at a proper time the enlargement of our library accommodations, so that we may be able to receive in our library room all our books and papers, many of which have to be stored in different parts of our building not easily accessible and not so safely placed as is desirable. I hope we shall be able to have galleries about our library walls, with suitable alcoves for receiving our books, or otherwise have our library so

remodelled as to make it not only more useful but more tastefully arranged than it now is, and better fitted for the preservation of our collection of books, which is probably the largest and most valuable in the world upon horticultural subjects, and which will be certainly increasing in number for many years through the liberal provision made for the purchase of books by the founder of the Stickney Fund.

Though circumstances have prevented the improvement of our real estate during the past year so as to augment very largely our revenue, yet I am happy to report that all our stores are well rented at fair rates to good tenants, and that while we have realized from the stores an income of about the same amount for the last as the previous year, we have secured rentals for the year which we have now entered upon aggregating more than twenty-five hundred dollars in advance of the past year.

There is so great a competition among lessors of halls which have been lately erected that we have not obtained for the past year, nor can we expect in future, so large a revenue from our halls as we have heretofore received in some years. It is therefore of importance that the Society should alter and improve that part of its estate used for stores as soon as it can be done to our advantage.

We shall receive from the Proprietors of Mount Auburn Cemetery $4,399.68 as our share of the operations of that corporation during the past year, which is an increase of $444.87 over what was received the previous year from this source.

The payment of taxes on our estate imposes a burden of more than $3,500 annually of expenditure. There seems to be no good reason why the State should not give to horticultural societies the same assistance it offers to the agricultural, in exemption from taxation. The Worcester County Horticultural Society has recently taken the initiative in endeavoring to obtain relief from taxation, and our Society has voted to coöperate with that and other horticultural societies in this State in petitioning the Legislature for such relief.

I would suggest the importance of establishing liberal prizes in various specialties of horticulture for stimulating cultivation by small growers, so that those of limited resources may be induced to compete, without exceeding their means, with the wealthier, for the honors and rewards of our institution. It would be unwise, however, to do anything which would tend to lessen the ambition

of distinguished and successful florists, or gentlemen of means, to add to their gardens new and valuable specimens in horticulture, which must be imported at a large expense; for by such importations the whole community is benefited, and the scope of the Society's usefulness is greatly extended.

I trust that the Society's interest in window-gardening will not diminish, but increase, and that measures will be taken to foster this desirable branch of horticulture more than has been done heretofore, and as our means will permit.

It is but just, in concluding the review of our work, that I should bear witness to the ability and fidelity manifested by our Treasurer and Secretary in the performance of their respective duties during the past year.

Ladies and Gentlemen: — We are very fortunate in having still with us so many of the eminent horticulturists who have done invaluable service in building up our institution to its present distinguished position of usefulness. Let us never forget them, nor fail to appreciate what they have done for us and the cause to promote which this Society was established. But we must remember that, however wise men are and however important may be their services, yet they must, from time to time, in the order of nature, pass away from the scenes of their earthly labors. The strength and permanence of our Society must be maintained and secured by introducing young and vigorous blood into our body corporate. Let, therefore, young men and women be introduced and encouraged by you to work in the field which we have cultivated with much satisfaction; so that, when the elders rest from their labors, the young may be ready and able to take up the work and prosecute it with as much, if not more, diligence and success than those who have gone before them, and thus our beloved Society will never suffer from the decrepitude of age, but ever be an active and earnest organization, carrying out the objects of its founders in promoting the study of nature and benefiting mankind.

The Treasurer requested further time to prepare his annual report, which was granted.

On motion of William H. Spooner, Chairman of the Committee on Plants and Flowers, an appropriation of one hundred dollars was voted, to be used at the discretion of that Committee for the encouragement of the exhibition of flowers during the winter months.

The appropriations for the year 1884, recommended by the Executive Committee on the first Saturday in November, and then laid on the table, were taken up and unanimously passed, as follows: —

For Prizes and Gratuities,	
For Plants and Flowers	$1,750
Fruits	1,000
Vegetables	550
Gardens	150
For the Committee on the Library for the purchase of magazines and newspapers, binding of books, continuing the card catalogue of plates, and incidental expenses of the Committee . . .	400
For the Committee on Publication and Discussion .	150
For the expenses of the Committee of Arrangements	300

Edmund D. Sturtevant, of Bordentown, N.J., and
William E. Doyle, of East Cambridge,

having been recommended by the Executive Committee as members of the Society, were, on ballot, duly elected.

Adjourned to Saturday, January 12.

MEETING FOR DISCUSSION.

Manures: their Preparation and Application.

Benjamin P. Ware, who had been appointed to open the subject, said that he felt some embarrassment in speaking of it in the presence of many persons who were in the habit of handling large quantities of manure: it seemed like bringing coals to Newcastle; but he hoped to draw out something from those who had had so much experience. The subject is very broad, including all materials that may be used as fertilizers; but he should refer mainly to those used by farmers. Here they have more resources than in a sparsely populated place. There is hardly a manufacturing establishment that does not have waste products of value, either as fertilizers or divisors, and worth at least the cost of teaming. But the first and main resort of the farmer is to the stable and barn, which afford complete and reliable manures. At farmers' meetings, if one states an experiment with fertilizers, another will

come forward with a different story to refute it; and such is the diversity of results, from diverse circumstances of climate and soils, that it is probable we know little of the value of stable manure. In most of the modern city stables all the liquid manure goes into the sewers, and when the manure is taken to the farm it is thus bereft of half its value. Last Monday, after an expenditure of four millions of dollars on sewers, the city of Boston began forcing into the sea as much more in value. Our country is almost inexhaustible in its resources, or it could not stand such waste. All barns and stables should be so arranged as to save the liquid excrement. This is done by many, but others lose it. The speaker has so arranged his barns, which accommodate twenty or thirty horses, and nearly as many cows, that the liquid manure is all received in a large tank.

Sea-shore drift and all vegetable matter from the sea form valuable manures, as does also the refuse of tanners, curriers, and glue-makers. The last is difficult to handle, but is especially valuable on moist grass lands and orchards, and, when ploughed into such, the effect is visible for years. Spent tan and the refuse after making extract of logwood are burnt under steam-boilers; but the ashes are of little value: the extract seems to take all the valuable quality. Wood-ashes are obtainable from Canada, but cost about all they are worth. Leached ashes are well worth their cost. Where a heap has laid, the fertilizing effect has been visible for years. They are not worth as much since the new process for extracting potash was introduced as before.

Mr. Ware said he would venture to mention salt as a manure. He had seen very valuable results from its use. If not plant food, it is certainly taken up by plants, as is shown by their salt taste. For mangels, carrots, and cabbages, it is valuable in connection with other manures, and farther inland it must be more valuable. He had seen large crops of grass where salt had been washed from fish which was in process of curing. He would apply from ten to twenty bushels per acre of refuse salt, which can be obtained very cheaply.

There is value, as a manure, in meadow mud. He would not dig and cart it to the field directly, but would expose it to frost for two years, when it would become a valuable absorbent and contain valuable fertilizing qualities. A specimen which had barely a trace of nitrogen, by exposure for two years, became rich in nitrogen. It is a good divisor, and gives valuable results with sea

manure, — much better than sea manure alone, the latter, by its violent and rapid fermentation, developing what was latent in the mud.

Night-soil is valuable, but it will not do to depend upon it alone; it must be used in connection with other manures. Used alone it would prove disastrous.

Farmers should depend mainly on their barns for manures, and use commercial fertilizers to eke them out and assist them. A report from the Connecticut Agricultural Experiment Station says that the price of commercial fertilizers is from thirty to thirty-five per cent. above the value of the materials, and farmers pay that for mixing and manipulating them. This may do on a small scale; but the speaker recommended to farmers using large quantities to buy the materials and mix them, and save this expense. One of the most important of these ingredients is fish pomace, which farmers can buy as cheap as the manufacturers, and they should buy it by the ton and compost it in the field. Manufacturers are doing a good work, but the farmer must save all he can. Many fertilizers are purchased by the manufacturers' analysis, but even when these are correct, we may pay thirty or forty dollars for what is not worth over ten or fifteen dollars. Stable manures have a double or triple duty to perform: they not only supply plant food, but they have a chemical or mechanical action that brings out the fertilizing properties in the soil. Commercial fertilizers leave the soil in a sodden condition; and this should be taken into consideration in deciding on their economy as compared with stable manures.

In regard to the application of manures Mr. Ware said that the time has gone by when farmers need fear to spread manures at any time lest they should lose by evaporation. Ammonia does not form as such when manures are spread. If the land is in good condition for teaming they may be applied at any time. Green manure harrowed in in the fall will be plant food in the spring. Fresh manure, if it does not injure the crop, will induce stalks rather than seed or fruit. It should be composted to produce seed or fruit; but, if foliage is wanted, it may be applied green. A bad smell does not necessarily indicate plant food, neither does color. The speaker can judge by the smell when manure is matured and in the condition to produce fruit. If applied in autumn it will be in very nearly the same condition in spring as if composted. He did not feel sure that fertilizing properties are not added to manure in composting. During the last war with England, when

every source of saltpetre was sought, the manufacturers found that by pitching over their nitre heaps the quantity was increased, though the speaker could not say how. Nitrogen is expensive, and difficult to retain and hold. Lawes and Gilbert have experimented in regard to it for thirty years, and have come to the conclusion that they know very little about it. It has the appearance of accumulating in the nitre-beds; and, if this is so, composting has an advantage, besides maturing the manure, of adding nitrogen from some source.

The finer the condition into which we can get manure the more accessible it is to crops. There are two kinds of manure-spreaders in the market, either of which will do the work better than it can be done by hand. Six cords spread in this way will do as much *present* good as eight cords spread by hand. He referred to where from six to ten cords are used; if twenty or thirty cords were to be applied it would be as well to spread by hand. He believed in applying manure as fast as made. He would not object to spreading on snow, but would object to applying freely on frozen ground or on a steep hill. He had, however, seen water colored by manure washed down into a hollow, where the crop did not appear to be the better for it. He would apply manure on the surface and harrow it in, but never plough it in, unless he ploughed a second time. If manure is applied in the autumn, and the ground is ploughed in the spring, it brings up the soluble portion that has washed down.

In answer to an inquiry how to apply liquid manure Mr. Ware said that there is a difficulty in doing it. He has an absorbent bed near his tank and dips the liquid into it; and he recommended this method. Some bed their cattle with dry meadow mud, sawdust, or sand, which absorbs the liquid, and then it goes in with the solid part. Applied by means of a water-cart it may be as valuable; but it is a more costly way of using it. He advised not to top-dress grass land, as a general practice, but, after four or five years, to put on manure, plough up, and re-seed. There is great value in the decaying sod. He preferred to put manure on ground that he is going to till rather than to top-dress grass with it; and he would plough first, and then apply the manure, and harrow in thoroughly. The principles he had laid down might be true in one place and not in another.

W. W. Rawson said that he had been experimenting twenty years in market gardening with stable manure, of which he uses

from fifteen to twenty-five cords to the acre, with five or six tons of guano, a ton of ammonia, and half a car-load of ashes, on seventy-five acres. Stable manure is now cheaper than he ever knew it before. Mr. Ware spoke of applying manure on the surface of the ground in fall. The speaker had applied twenty-five cords in this way upon one acre, and on another acre adjoining thirty cords of coarser manure, which was ploughed in six inches. The next spring they were both ploughed and cultivated alike, and he could see no difference in the crops. He keeps experimenting all the time, and always gets good crops. Last year was exceptionally severe in regard to drought. He uses one-half salt-water from Mystic river for irrigating cabbages and cauliflowers, and thinks it better than fresh. He has two windmills for raising water, and has spent two thousand dollars on water-works. He thinks horse manure is worth as much as cow manure, if in as fine condition. Cow manure is very heavy, and its mechanical action on the land is like that of commercial fertilizers; while horse manure is light and strawy, and leaves the land in better condition.

George Hill said that farmers admit manure to be at the bottom of all good culture. He agreed with Mr. Ware on many points, but disagreed with him on others. The supply, varieties, and cost of manure are all important. The prices of fertilizers vary from a dollar or a dollar and a half for stable manure, before moving, to sixty dollars or more, per ton, and it is a question which is most economical. Stable manure costs, at the stable, three dollars per cord, weighing from two to three tons; and ammonia costs ninety dollars per ton. Some fertilizers are composed largely of substances costing not over one dollar per ton, and are sold for thirty or forty dollars for the same quantity, and it is a question whether or not to purchase them. Beyond ten miles from the city there is not a fair supply of stable manure. He thought night-soil the substance nearest to plant food; but, while the night-soil applied to a piece of ground might all be taken out by crops in one year, stable manure will be effective for several years. Some have thought that the loss of the liquid part of stable manure makes no perceptible difference in its value; but he could not agree to that. Muck may be valuable as a fertilizer. He thinks manure is best put under ground as soon as possible. There is the greatest waste in throwing away the sewage of Boston and large manufacturing places. It is next in value to manure, and its loss is a permanent drain upon the fertilizing resources of

the State. Senator Hoar says that only four per cent. of the food consumed in this State is produced here, and we ought to produce more. The speaker believed that sewage would not go to waste many years longer, and asked if it could not be settled so as to be saved. Of the two thousand four hundred and sixty counties in the United States, four in this State stand highest in the value of their productions in proportion to the value of the soil, and of these Essex, Middlesex, and Worcester are first.

Edmund Hersey said that the subject before the meeting is difficult to handle. The varying character of soils is an important element, and every man must study his own soil. What may do for one man's soil may not do for another's; what has been applied to the soil and what has been taken from it are considerations having a great deal to do with the problem of judicious manuring. We are driven to study it because no man can teach us to solve it. A man who has been applying twenty-five or thirty cords of manure per acre is very differently situated from one who has applied but two or three to soil perhaps poor to start with; and the same rule will not do for both. The soil of the first is filled with manure in all stages of decomposition, while the other has very little in it. One buys concentrated fertilizers; the other, stable manure. The comparatively barren soil needs stable manure, while the other is more in need of concentrated fertilizers. The speaker could not stand up and tell any man how to fertilize his soil, but would advise him to study his soil and the wants of the growing plants, and make himself familiar with the character of the different fertilizers. We may learn general principles here, and then we must go home and apply them in our farming. We must supply to our crops those materials that they need, and those fertilizers that furnish the needed materials cheapest.

Samuel Hartwell said that he lives outside of the radius of ten miles from the city, and that his greatest anxiety is to get sufficient manure. He keeps a team on the road a large part of the time, but cannot get enough to apply fifteen or twenty cords to the acre. He believes cow manure, from well fed animals, better than horse manure. Horse manure shrinks, and cow manure remains in the ground longer, and is better for fruits: it does not act so quickly. He is now using considerable quantities of meadow mud. An Irish neighbor mixes mud with his manure, and in a dry season his corn is better than the speaker's. Mr. Hartwell puts a foot and a half of mud on the bottom of his barn-cellar, and throws down the manure

on it; the hogs work it over, and then he puts on another layer of muck. He had also added ten or twelve cords of leaves, which will be mixed with the manure by spring. Muck is much more valuable on some soils than on others. He finds it a good thing to help out his manure. There is not enough money left from the proceeds of the crops, after paying for commercial fertilizers, when employed alone, but they may be used to advantage in the hill to start crops. He referred to Dr. Nichols's recommendation of chemical fertilizers, and thought he got the money to buy them in some other way than by farming. The speaker never favored the use of salt; but a man in Concord had a field of cabbages which, he was told, needed salt, and was advised to sprinkle it into the heads. He did so, and they headed up remarkably well, and he sold them where they wanted them again the next year.

Mr. Ware said, in answer to an inquiry as to the value of clay, that it is very valuable in certain places, on soils of peculiar quality. Water percolating through soils has its fertilizing qualities absorbed by clay. Its mechanical effect on light soils is very beneficial. It should be spread on in the fall.

John Fillebrown said that he had used all kinds of manure, and had come to the conclusion that he could raise better crops with night-soil than with any other manure. He did not agree with Mr. Ware that it produces disastrous results if used continuously. He put eight loads on less than half an acre in the fall, and in spring ploughed, and planted cabbage greens April 1st. May 1st, he planted summer squashes, and picked, one week, sixty dollars' worth. On the 1st of June he wanted to plant carrots, and used night-soil, putting the rows fourteen inches apart, with radishes between. The radishes were as handsome, and the carrots as smooth and good, as he ever saw. He composted meadow mud with night-soil, and applied a light shovelful in the hill to Savoy cabbages on the 5th of August, and they grew so rapidly that he had to cut them to keep them from cracking. He had used tide-water for watering tomatoes in a dry summer so freely that the ground was whitened. It would have killed the plants early in the season, and would kill melons at any time, but is good for cabbages, celery, or horseradish. He had teamed clay two miles and a half, and applied to light land at the rate of from ten to fifteen cords an acre, and it was worth as much as horse manure. The effect remains; and he would use more if he could get it.

Leander Wetherell believed in the good effect of salt and muck.

He thought muck had been undervalued since Dr. Loring declaimed so earnestly against it. The speaker took muck out of a swamp composed largely of vegetable mould, and used it side by side with stable manure, on light soil, and saw no difference in the crops. It was an advantage to the land, and there is no doubt that light sandy or gravelly soil applied to meadows is equally beneficial. He advised the exchange of swamp land and sandy land, one for the other, as a top-dressing.

Mr. Ware said that green manure applied in the fall would be matured by spring. He would not put it on in spring, except for plants of which the foliage is the useful part.

Hon. Marshall P. Wilder spoke of the agricultural meetings at the State-House in former years, when the subject now before the meeting was discussed, and said that it is as important now as it was then. Its principles are not only fundamental but immutable, and it is no matter how often they are repeated. A few years ago he had two farms, and tried all kinds of chemical fertilizers on them. It is a fact that we could not get along in our farming without chemical fertilizers. It is better to apply manures near the surface. The late Hon. Benjamin V. French ploughed in manure a foot or more deep, and it produced no effect whatever. The soil and the manure should be properly prepared. The finer you can make the particles of manure the more efficient it will be. He had found cow manure produce better effects than horse; when you buy it you get pretty nearly what you pay for. People may say these things are hackneyed; but you cannot bring the truth too often before us, whether relating to the culture of the soil or the soul.

The subject for the next Saturday was announced as "Small Fruits — What shall we Plant, and How shall we Cultivate them?" to be opened by E. W. Wood.

BUSINESS MEETING.

SATURDAY, January 12, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

On motion of Edward L. Beard, Chairman of the Committee of

Arrangements, that Committee was authorized to procure five hundred vases of one size, and one hundred and fifty of another.

Adjourned to Saturday, January 19.

MEETING FOR DISCUSSION.

Small Fruits — What shall we Plant, and How shall we Cultivate them?

E. W. Wood, Chairman of the Fruit Committee, who had been appointed to open the subject, said it had often been remarked that we fail to appreciate a thing until we are deprived of it; and this is true with regard to small fruits. Travellers abroad are unable to purchase them as freely as they can here, and there is nothing that they miss more. There is no place where they are grown more easily, or in greater perfection, than here. We wonder that in the Old World so much pains should be taken to produce fruits and flowers, as was done, for instance, by a lover of them in Paris, who put a garden on the roof of his five-story house, where he cultivated pans of roses and other flowers, which grow here almost as regularly and certainly as grass.

Mr. Wood said that, among small fruits, he should speak of strawberries, raspberries, currants, and grapes. Of these, the strawberry is, perhaps, the most important and the most difficult to discuss, because no fruit is so variable. If we refer to the prize-lists of this Society, and of New York and Western societies, we shall find that the kinds for which premiums are offered and awarded vary greatly in each. Many of the kinds most approved in States west of this have been tried here and have failed. There are two classes of cultivators of strawberries, those who grow for the market, and those who raise them for family use. For the latter purpose the varieties of the finest quality should be selected, though they may not be so prolific as those grown for market. Mr. Wood said that any list he might suggest would be very likely to differ from one proposed by another cultivator near by, but he recommended for market, from his own experience and observation, the following, which are placed in the order of their value: Charles Downing, Sharpless, Hervey Davis, Cumberland, Miner's Prolific, Manchester, Wilson, and Crescent.

The Charles Downing is the most popular variety introduced since the Wilson, and stands first among cultivators everywhere,

being larger and of better quality than the Wilson. Three years ago it rusted, and the speaker lost a large portion of his, but since then he has seen no rust. The Sharpless is comparatively new, and has proved desirable both for market and home use. It is the largest strawberry of good quality, — twenty-three berries have filled a quart box. A neighbor of Mr. Wood paid thirty-five cents for such a box, which was at the rate of a dollar and a half for a hundred berries.

The Hervey Davis is a seedling raised by John B. Moore, and has been tried here for ten years, — long enough to prove that it has come to stay. The speaker hoped for an improvement in selling strawberries; at present, they are bought by consumers more ignorantly than any other fruit. They know something about the varieties and qualities of pears, but they buy strawberries wholly by the looks. He asked a dealer in Quincy Market if there was no way to make the varieties of fine quality pay; and the dealer replied that until last season he had been unable to accomplish anything in that direction, but a grower who had a large quantity of the Hervey Davis, and wished to get the best price for them, asked him to call the attention of his customers to them and he did so, with the result that soon all his supply of this kind was engaged a day beforehand, not only by consumers but by other dealers.

The Cumberland and Miner's Prolific are generally grown on a large scale in Concord and vicinity. The Manchester is a new kind, of vigorous growth; but the color is not good, and the hull is so deeply planted that it is difficult to remove. It is not suited to amateur culture. On light soil, a little dry, no kind will produce so much as the Wilson; it looks well and brings a good price before it is ripe, and is marketed in that condition; when fully ripe it is as dark as the Agriculturist, and is of fair quality. The Crescent is claimed to be the lazy man's strawberry; it is not of large size, and in quality is not superior to the Wilson. It is only desirable for the money it will bring when no other kind is in the market. A grower in Belmont gave his Crescents to his neighbor and marketed his Hervey Davises.

For amateur culture Mr. Wood recommended the Hervey Davis, Wilder, Seth Boyden, Hovey, Jucunda, and La Constante, in the order named. The Hervey Davis is not as productive as the Downing or Sharpless, but it comes through the winter in good condition, has great vigor, which it retains through the season,

stands up well in drought, and continues long in bearing. The Wilder is of the finest quality, but has not proved prolific under all conditions. The Seth Boyden is a good bearer, and of good quality, and remains in good condition after picking. The Hovey fails to do what it formerly did; as with the Brighton Pine, the fruit seems to be all gone after the first picking. In regard to growth it maintains its pristine vigor, but makes many barren plants, and does not produce the quantity it did twenty years ago. The Jucunda requires heavy clay soil, and higher cultivation than most kinds, and, if it has these, is handsome, of excellent quality, and fairly productive. La Constante is the standard of quality, and when well grown almost invariably takes the first prizes in the exhibitions; but it is a shy bearer, and not reliable for a crop. Many are induced to grow it from seeing the specimens shown, but, not giving it the extra care it needs, are disappointed. Mr. Wood concluded his remarks on varieties by saying that many cultivators might think the varieties and arrangement named by him not the best; and it is true that strawberries differ much in only a few miles' distance, and allowance must be made for difference of soils and situations.

In regard to culture, as a general rule, the best land for English hay is good for strawberries. English hay suffers from drought, and the same is true of strawberries; and, as the first continuous dry weather comes when they are maturing, land subject to drought should be avoided. The ground should be in the highest condition when the plants are set. The large Belmont growers find it most profitable to take but one crop, planting vegetables between the rows the first year, and ploughing in the strawberries and planting vegetables as soon as the crop is gathered the second year, thus getting two crops of vegetables and one of strawberries in two years. For family use they are generally grown in plats, and, as it is difficult to fertilize them after the ground is covered, they should have all the manure possible given them before setting out. If fresh stable manure is applied then, it will be in condition for plant food before the runners spread. The speaker sets his rows three feet apart, and the plants eighteen inches in the rows, and lets them run the first season. The large growers put the rows four feet apart, and cut off the runners, so as to leave paths between; but, for family use, they can be picked from beds with but little injury to the plants. When the crop is gathered he digs in the plants so as to leave beds three feet wide with three-feet spaces

between; and they will give nearly as good a crop the second year as the first. The third year they are all dug under, for it is more work to weed them than to set a new bed.

Of raspberries Mr. Wood recommended the Franconia and Herstine for Red, and the Souhegan and Gregg among the Black Caps. Raspberries are not so generally grown as strawberries: it is more difficult to protect them; but statistics show that they give more money from the same extent of ground. The Franconia is one of the oldest and best known kinds, and takes the most prizes. The Herstine is generally grown for market, though the Cuthbert is reputed more prolific. The Clarke is as hardy as any; the speaker grew a bed of it for seven years without any protection, but then lost it entirely. It is of fine quality, and desirable for family use, but too soft for market. The Saunders is of the finest quality, but too soft to be desirable for market. The McLaren's Prolific is a new kind, shown for the first time last season; it resembles the Hornet, and is of good quality, and is reported by the exhibitor to be vigorous and productive, and in every respect the best he has ever grown.

Black Cap raspberries are not esteemed here; they are too wild and rampant growers, and the fruit of most varieties is dry. They will, however, grow on dry land, and need no winter protection. The Souhegan and Gregg are the best varieties.

Of currants the Versaillaise and French Transparent have taken the most prizes. The speaker esteems the Versaillaise the best red currant. It has been objected to it that it does not give as large a crop as some varieties; but he had never failed to get a good crop; the branches of his bushes are bent to the ground with the weight of the fruit. A large grower from Belmont was in his grounds and asked him what currant he cultivated, and, when he answered the Versaillaise, replied that he was surprised, for he had pulled up and thrown away all his years ago. He recommended, as much preferable, a variety obtained from the Cushing Place, and now generally grown at Belmont and Arlington. Last year a neighbor of the speaker, who grew the common varieties for market, sold them for two dollars per bushel, while the speaker got four dollars and eighty cents per bushel for his Versaillaise. The currant is a most profitable and most accommodating fruit; it can be grown in a pear or apple orchard between the rows, and will return enough to pay for cultivating the whole orchard. The French Transparent is distinct from the Dana's Transparent; the

former is as large and handsome as the latter, and of better quality.

The last season offered the best exhibit of grapes for many years. They suffer less from drought than other fruits, and long-continued dry weather gives the fruit the best quality. But these very favorable seasons lead people to set out varieties that will disappoint four years out of five. If we mention the Concord, Moore's Early, Worden, and Delaware, which may be recommended in the order named, we have come to the end of those that can be relied on invariably. The Brighton is of most excellent quality, but sometimes mildews, and is an entire failure. The Eumelan is less shown than any other equally good variety. Last year they were as good as outdoor grapes could be. Of Rogers's hybrids the Massasoit, Wilder, and Lindley are among the best; the last, when in perfection, is as good as many grapes grown under glass, but it is less productive than the others. Among the new white grapes are the Francis B. Hayes, Prentiss, and Pocklington. If the first of these is as good as it was last year, it will be unquestionably the best white grape, and will carry the name of the President of this Society down to future generations. It will be second in value only to Moore's Early. The Prentiss is not grown as much as it deserves to be. The Pocklington was not ripe when shown at our Annual Exhibition last year. For New England we must adhere to the requirement of earliness in grapes. Once in four or five years even the Concord fails to ripen. Dr. Fisher, of Fitchburg, one of the best cultivators, has lost his crop twice in twelve years.

Mr. Wood closed by saying that the subject before the meeting is of the highest importance. He was surprised that every family does not have a plentiful supply of small fruits: they are more valuable for health than the services of a physician, and are associated with the pleasantest memories of childhood.

Hon. Marshall P. Wilder said that Mr. Wood's remarks were highly practical,— the result of long experience tempered with conservative views. He should himself have made just such a selection of strawberries as Mr. Wood, though he might have placed the Wilder before the Hervey Davis. The Charles Downing is spread all over the country, as is shown by the catalogue of the American Pomological Society, and it increases in favor every year. It can be grown almost without care, and, unlike the Wilson and Crescent, is of remarkably good quality. Mr. Downing is fortunate in having such a fruit to bear his name. We must have one mammoth

kind, and one is enough; and we have it in the Sharpless. The Hervey Davis is one of the best in quality. The speaker desired handsome form and color in strawberries; and we have it in the Hervey Davis and Wilder. The former was raised from seed of the latter. The Hervey Davis is going to stay with us; it comes in early, and bears sufficiently, and holds out late, and the more it is known the better it will be liked. The strawberry is the most capricious of fruits; a variety will sometimes be a dead failure within twenty miles of where it succeeds perfectly. A neighbor of his grows two acres of the Wilder strawberry, and will not grow any other,— and the same with the Versaillaise currant. The Manchester is wonderfully vigorous, surpassing even the Sharpless. The speaker does not believe in the deterioration of varieties. The White Doyenne pear prospers in Nebraska, and he knows the Hovey strawberry is sometimes as fine as ever. The Franconia raspberry, introduced more than forty years ago, still stands, and will continue to. He esteems the Knevett's the best red raspberry; but Mr. Wood's list is a good one. The Souchetti (white) is the kind he depends on for family use. The Versaillaise currant is everywhere reported as the most profitable. His crop from bushes planted ten or fifteen years ago, between lines of pear trees, brought him one hundred and forty dollars.

Mr. Wilder next spoke of grapes, and remarked how certainly a good thing will take its place. The excellent quality of the Lindley is becoming appreciated, and neither it nor the Wilder ever mildews with him. Moore's Early is so popular that the demand for vines cannot be answered. He thinks very highly of the Francis B. Hayes; it is the best white child of the Concord, and he believes that it is going to succeed almost everywhere, and will give larger bunches than it has yet. We are planting seed that is going to rise up and bless the world after we are gone. In cultivating fruit we must rely on practical experience, and not on what we guess.

Benjamin G. Smith said that he commenced the culture of fruit twenty years ago, with the determination to have his ground prepared in the best manner, and to collect every variety of small fruit worth growing, so as to test the possibilities of a small area. His soil being naturally heavy, he underdrained and subsoiled thoroughly, at the same time working in plenty of sand and barnyard manure. He cultivates the Pioneer for an early strawberry, and the Wilder, Hervey Davis, Downing, Cumberland, and Miner's

Prolific, for later. The James Vick has thus far disappointed him. He has Versaillaise currant-bushes twenty years old, and one with a stem three inches in diameter, still vigorous, and producing fine fruit. The Victoria, or Houghton Castle, had done well with him, but he did not recommend it particularly. It is late, continuing into September, and very productive, but not of so good quality as the Versaillaise. He cuts out the old wood from his currant-bushes. His crop of English gooseberries has not failed for ten or twelve years. They are sheltered from the burning sun of noon, but have the morning and afternoon sun. The ground was thoroughly prepared, and they are pruned very severely. English cultivators talk about gooseberry trees, and some of his plants have stems two inches thick, though short. He has found the Franconia, on the whole, the most satisfactory raspberry, though he grows also the Cuthbert, Souchetti, Caroline, Gregg, and Shaffer's Colossal; but the last three are not of the highest quality. Of blackberries he grows the Dorchester and Snyder. He has experimented with twenty or thirty kinds of grapes, and will discard all but about half a dozen.

Mr. Wilder said that it is no object to grow Black Cap raspberries here; we have got beyond it. The Souhegan is the best; it is juicy, while the others are dry. The Caroline, a yellow one, is spirited and excellent, and very hardy. These two can be recommended.

Mr. Smith gave an account of his success in cultivating the High Bush blueberry. The late Joseph Breck told him that he might as well attempt to tame a North American Indian; but he saw it fruiting at the Botanic Garden, in Cambridge, and experimented with a few plants, which he set on the east side of a high fence, subsoiling the ground and working in from fifty to a hundred loads of muck or leaf mould. Some of the plants must have been ten or fifteen years old when set, and they have grown and fruited well.

John B. Moore said that in fertilizing ground for strawberries or raspberries it is detrimental to use partially decomposed manure, especially on sandy soils. Strawy manure makes soil more liable to suffer from drought, which is the worst thing a cultivator of these fruits has to contend with. Raspberries are especially liable to injury, and should receive a heavy mulching the first of June, which must be removed after the crop is gathered, or it will bring the fibrous roots too near the surface; and the

same treatment is beneficial to currants. He would not cultivate raspberries more than five or six years in one place, as the soil gets exhausted. To do so is not following the ways of nature, which reproduces the raspberry from the roots that spread from place to place. We can aid the ways of nature, but we cannot beat them. After three or four years raspberry plants become old stubs. The same reasoning applies also to strawberries. The Franconia is firm and carries to market well, but it is not cultivated as much as it was a few years ago. He cannot grow it on his place, but on high, rocky land, a few miles away, it proves what Col. Wilder had said of it. The speaker could not say what variety is better. The Souchetti is of fine quality, but too soft to send to market unless the hulls are left on. He has not seen a quart of Wilder strawberries in the market for four years, but he has seen some Hoveys. One reason for the failure of the Wilder to come into general cultivation is, that it inherits from its female parent, the Hovey, and to even a greater extent than that possesses it, the tendency to produce sterile plants. He went through his bed with a large knife, and cut out all the sterile plants. People want a large strawberry, and he did not feel it his duty to sacrifice his interest to correct the public taste, but for his own use he wants a strawberry that he can go into the field and eat; and this he can do with the Wilder and some other varieties. He would not throw away the Rogers grapes if he had them, but he would not plant them for market purposes. He thinks the Massasoit the most desirable; it is more productive and a little earlier than the Lindley, but the latter is of finer quality.

Mr. Wood said, that, in the peculiar "Concord sand," in which Mr. Moore grows his strawberries, he might be unable to use fresh manure; but the speaker had used both old and fresh, and the latter in large quantity, and it assimilates before the roots reach it.

Mr. Moore said that the difference in soils would account for the difference in the effect of fresh manure.

Mr. Smith said that he had grown raspberries successfully in the same place for twenty years; but he would not advocate doing it generally, — he only asserted the fact.

William C. Strong thought the currant referred to by Mr. Wood as cultivated in Belmont and Arlington is the May's Victoria. He considers it very valuable; it is not so acid as the Versaillaise. He fruited Fay's Prolific for the first time last year; he was not sure but it is larger than the Versaillaise, and, though not yet all

that has been claimed for it, it is promising. He asked whether the Cherry currant is distinct from the Versaillaise.

William D. Philbrick said that the currant grown at Belmont, resembling the May's Victoria, was got by Henry Locke from Jacob Hittinger. It is known as the Belgian, and is very productive, late, and holds on well. He grows it as a late kind in connection with the Cherry as early. The Cherry, as grown by Mr. Locke, is distinct from the Versaillaise.

Mr. Wood said that the currant he had in mind was received by Samuel Barnard, of Belmont, from Samuel R. Payson.

J. W. Manning spoke of Lovett's Improved as the sweetest red currant. In size it is half-way between the Cherry and the Red Dutch. He received it from the Messrs. Clapp, who raised twelve hundred bushels of this and other varieties in one year. J. S. Stickney, of Wauwatosa, Wisconsin, raises the Cherry and Red Imperial currants; the latter is so firm that he has no difficulty in sending it to Kansas City or the Rocky mountains.

Dr. Howland Holmes said that the currant which he spoke of at a meeting of the Society last season as the Belgian or Grand Imperial is much the same as the Versaillaise. If he were setting out currants to-day he should not give it preference over the Versaillaise.

Mr. Wilder said that in this discussion the importance of irrigation had been overlooked. We have not control of the clouds, and no man can successfully cultivate strawberries year after year without irrigation. He agreed with the views expressed by Mr. Rawson at the last meeting in regard to the value of irrigation. We must come to it, and our best farmers are taking the subject into serious consideration. Manure is ineffectual without water. Strawberries are very likely to suffer from drought just as they are swelling off, and, as he had often said before, they need water, water, water!

Joseph H. Woodford spoke of the value of cold storage in preserving fruits. One of his neighbors tried the experiment of placing three pecks of Sheldon pears in cold storage last fall, when he would have been glad to give them away to get rid of them, and a gentleman from New York, who saw them yesterday, offered ten dollars for them to put on his table. If sound pears are selected when there is a superabundance and sent to cold storage, every one can have pears on his table for six months of the year.

Mr. Wilder said that he ate Anjou pears this morning which were kept without ice.

It was announced that, on the next Saturday, John G. Barker would read a paper on the "Care and Cultivation of House Plants."

BUSINESS MEETING.

SATURDAY, January 19, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President alluded to the loss sustained by the Society in the death of Edward S. Rand, who perished in the wreck of the steamship "City of Columbus" on Friday morning. Mr. Rand was one of the oldest members of the Society, and a Vice-President from 1858 to 1861, and still retained a warm interest in it.

A letter was read from Peter Henderson, of New York, offering premiums, to be awarded by the Society, for specimens of the Sunset rose and White Plume celery. The letter was referred to the Executive Committee.

Adjourned to Saturday, January 26.

MEETING FOR DISCUSSION.

THE CARE AND CULTIVATION OF HOUSE PLANTS.

By JOHN G. BARKER, Lynn.

The subject of discussion to-day, The Care and Cultivation of House Plants, assigned me to open, has been written upon, rewritten, and discussed so many times, and with such acknowledged ability, that I do not expect to present anything new for your consideration; but if what I may say shall only draw from others of more experience their ideas, it may not be all loss that I make the attempt.

Among the many arts which are constantly improving in this aspiring age none have made a greater progress than gardening. It is a delightful recreation, affording the greatest pleasure in its

results, and confined not to the wealthy alone, nor to any particular class or society, or quarter of the globe. Flowers are, of all embellishments, the most beautiful; nothing can compare with or equal them. No matter how elegant the furniture, or grand the decorations of your rooms, flowers always have a place in them, and are the first things admired by your friends. The love for them commences in infancy; it remains the delight of youth, increasing with our years, and is the joy and happiness of our declining days.

The most essential requisite to the successful cultivation of plants in the house is a good window; what is called a bow or bay window, facing the south is best, the advantage being that it gives light on three sides, while the ordinary window gives it only on one. Another desirable feature is a glass door, or sashes, to shut off the window from the room. This will be found to be of immense advantage, particularly when sweeping and ventilating the room; the door being then closed, so as to keep off the dust as well as to prevent the cold air from rushing on the plants.

Ventilation, of course, is very essential, but should always be given at the top of the window. Cleanliness cannot be too well attended to; it is just as desirable to keep plants clean, if we want them healthy, as it is our bodies, if we want to be free from disease. Washing the leaves with a sponge with water of the same temperature as the air of the room will be a great help to their successful growth, as will also be an occasional sprinkling on a fine day, which may be given with a small brush where you cannot conveniently use a syringe. Perhaps there is nothing more annoying to the cultivator than the green fly. While smoking with tobacco is the swiftest and most effectual remedy, there are not many who care to have the fumes of tobacco fill the room, for, no matter how closely you shut your window, the scent will get out more or less. This can be remedied by making an infusion of tobacco water, as follows: fill a pail with the stems of tobacco, pour upon them all the water the pail will hold, let it stand twenty-four hours, and then use in the proportion of one-half pint of the infusion to a pail of water, which will be strong enough if the stems are good. The plants which are infested can be taken from the window, turned downwards, placing the left hand over the top of the pot to prevent accident to the plant, then plunging the plant in the liquid once or twice, until the flies drop off. This will be found quite effectual. Keep some of the infusion always on hand, and on the

first appearance of the green fly your remedy is always ready. After using the infusion rinse the plant in clean water of the same temperature as the room. I knew a florist, in Philadelphia, who always syringed his plants with a solution made in the manner indicated; he never fumigated; and I visited his houses frequently, and his plants were always clean.

A scaly insect, more common on Oleanders and other thick-leaved plants, adheres so closely to the stems and leaves that it is not so easily destroyed. These may be washed with whale-oil soap and water, or, what I think is better, Gishurst Compound. A sponge dipped in a little sweet or kerosene oil and wiped up the stem and under the leaves occasionally will keep off the scale quite effectually. I recently cleaned two large Epiphyllums with kerosene oil. During the summer they had been neglected and got very dirty; the oil was used liberally, and I confess with some doubt as to how the free use of it on that occasion would affect the plants. They were not injured in the least, but, on the contrary, are showing signs of a remarkably fine growth. I think these directions for the eradication of the green fly and scale will, if followed up, be found effectual for the red spider.

Watering, injudiciously done, is a great injury to plants; too much water is more frequently the trouble than not enough. The soil on the top of the pot generally shows when the plants need water, which is when it looks dry on the top. When you do water, let it be done thoroughly, and not in a mere driblet, that will not go more than half through the soil. The only rule I know for watering is to give it when the plants need it, never using it fresh from the pump or aqueduct without taking the chill off by letting it stand in the room or adding a little warm water. Plants grown in warm rooms require to be kept at all times moist but not saturated; but as the days grow longer, and the sun gets higher, and the plants begin to grow and flower, more water will, of course, be required. For the plants on the shelves close to the glass it will be found that a box placed on the shelf and then filled with sphagnum, plunging the plants therein, will be of great help, keeping the plants at a much more even degree of moisture and avoiding the spattering of the soil on the shelves and the glass. Plant the *Lycopodium denticulatum* in the sphagnum, and you have a clean green carpet for your plants. I would not, however, let it grow in the pots sufficiently to cover the soil, as you could not see so well when water was required for the plants.

I think a good rule to go by in regard to heat is that when you feel comfortable yourself, — not too hot nor too cold, — it is about right for house plants, as most of those which are grown in rooms are from temperate climates. Never be without a thermometer; 70° to 75° by day and 45° at night will be a good temperature. Arrange the blinds to slide between the shelves and the glass, and, if the weather is unusually cold, you will find no greater help than outside wooden shutters to put up in front of your window. Make them in small sections, light, and easy to handle, so that they can be put up by any one who happens to be at home.

Having glanced briefly at some of the requisites necessary in the care of plants, we will look a little at the kinds and cultivation. In our bay-window, at each side, we would have a vine of some kind, perhaps the variegated *Cobœa scandens* on one side and a Tropœolum on the other. A wire or wires may run up each side and over the top; to this train your vines, and let them hang from the top in festoons. In place of these some of the Maurandyas (which are very pretty), or such other vines as will meet your taste, may be used; then, with some hooks in the top of the window to suspend one or more hanging-baskets on, we have our window started. In these baskets the *Saxifrage umbrosa*, better known as London pride, although old and common, and also the common Moneywort (*Lysimachia nummularia*), will be very pretty, and, with such other plants as your taste may dictate, your baskets will add materially to your window.

For general cultivation a very pretty plant, and one which is highly recommended, is the *Torenia Fournieri;* the habit is dwarf and compact, and the flowers are produced in such great numbers as to form a complete bouquet; the foliage is a dark green, in striking contrast with the flowers, the color of which is a dark blue, with a bright yellow spot on the under lip. Being an annual, and easily raised from seed, it is all the more desirable.

Callas are beautiful for both foliage and flowers. Don't overpot them, for when they are pot-bound and well watered they bloom all the better. A very essential point in their culture is a thorough rest in summer, by turning the pots on their sides under a wall or fence and letting them remain there until they show signs of growth in the fall; then shake off all the old soil, repot in new, and bring to the light and water.

Geraniums will be the standard plants, and, with the many varieties which we now have, all so good, there can be but little

danger of making a mistake in the selection of varieties. For single varieties, Gen. Grant and Orbiculatum for scarlet; May Queen and Master Christine for pink; Miss Gertrude and Mrs. George Smith for salmon, with Paul Lucca and Snowflake for white, will be a good selection. For double varieties I recommend Bishop Wood, crimson shaded with cherry red; Henry Cannell, bright scarlet, and of fine habit; and Mad. Thibaut, fine pink.

A few pots of Carnations will work in well. Although Petunias are considered common, what can make a better show? A few pots of Mignonette, Sweet Alyssum, and Candytuft will add to the fragrance.

For the arrangement I would place these and all soft-wooded plants nearest the light, and the hard or smooth-leaved plants, such as Ficuses, Gardenias, Daphnes, *Hoya carnosa*, Dracænas, and Coprosmas behind them. In suggesting these, I speak from experience; the best Hoya I ever knew was grown in a window and stimulated with soapsuds as regularly as washing day came round; the same may be said of Gardenias.

Among bulbs, Hyacinths come first, and should be potted in November and December, and placed in the cellar or outside, where they will not freeze, covering up the pots entirely. Here they will root, and by bringing them out a few at a time, every week or ten days, after the first of January a display of these beautiful flowers may be kept up many weeks. I would also add Crocuses and Tulips if you wish them. I potted a quantity one winter, and, for want of a better place, put them under the piazza floor and had no trouble with them whatever.

The Oxalis, Sparaxis, and Tritonia must not be omitted; and I must not fail to call your attention to the great value of the Cyclamen for this purpose; it is an admirable window-plant.

The plants I have mentioned have been selected with the view that we have a good bay-window; but I would make one more suggestion: I would have this floor a little higher than that of the room, and laid so that the lowest point shall be in the centre, and with a pipe to carry off any waste water while washing or that may come over when watering, I think you have the starting-points of success for a good window-garden. This pipe may run outside the wall or into a pail or barrel in the cellar.

We must not omit the north or more shaded windows; for these, the oak-leaved Pelargoniums, *Aloysia citriodora*, and many of the

variegated leaved plants, as well as all of the finer ivies, will do well.

Plant-cases might also be mentioned as very desirable where a window cannot be entirely given up. This, however, is only a suggestion, as I have already taken more time than I intended; I will, however, suggest one more plan for decorating a room. Procure a pan twelve or more inches across and six deep; place in the centre of this pan a seven or eight inch pot; then place the proper drainage and soil in the pan. Plant in the pan any of the varieties of Tradescantia or *Lycopodium denticulatum*, which will grow and cover the surface of the pan and hang over the sides; in the pot, in the centre, put a nice plant of *Coprosma Baueraana*, Dracæna, Palm, or any plant which suits your fancy. Place the pan on a stand just large enough to hold it, opposite the window, and, with one or two brackets on each side of the window for such plants as you may choose, you have a decorated window or windows with very little trouble. The pot and pan being covered by the vine or moss, growing there and hanging over the sides of the pan, neither is seen, and in the pan a few cut flowers can be placed to enliven it, and they will last a long while. In this way you can have a pretty stand all the time, and can change your centre plant whenever you desire without breaking up all the pan. When more than one is used in a room I would not have any two alike.

My last suggestion is in regard to potting. Give plenty of drainage, and cover with a little moss or rough material to prevent its getting clogged up, for, if the surplus water does not pass off, your soil will become sour, the roots will rot, and the plant will die. For the plants that I have recommended a compost of one-third leaf mould and two-thirds of good turfy loam, with a little sharp sand, will answer well, adding a little fine manure for the geraniums and other soft-wooded plants; and for the bulbs, especially the hyacinths, a liberal supply of well-decomposed cow manure will help very much to give you good flowers.

Mr. President, I am aware that I have touched only very imperfectly upon a subject where there is so much to be said. I have taken a leaf from my own experience, and what I have omitted I hope the gentlemen and ladies present will supply, as I feel that they can; but this one thing I am sure you will all agree with me in, that in this as well as any other undertaking the great aid to success is enthusiasm in our work.

Discussion.

Hon. Marshall P. Wilder expressed the pleasure he felt in hearing this compact essay, and corroborated what the writer had laid down as the essential principles of window culture. More than fifty years ago, the speaker cultivated house plants in Montgomery Place, and this leaf from Mr. Barker's experience sounded like one from his own. Perfect drainage, whether in a flower pot or in the open field, is the basis of all successful culture. He has adopted the system of placing moss over the crocks in the bottom of his flower pots, and using plenty of both. The roots pierce into the moss, and find moisture to sustain the plants. It is essential not to over-water; do not let plants suffer, but never give them water until they are thirsty, and then water thoroughly, and afterwards withhold it until they cannot do without it. Light, air, and moisture are the great prerequisites for successful plant culture.

Gas, either illuminating or from coal fires, is bad for plants; it is almost impossible to grow them with either. He is acquainted with a gentleman in Dorchester, who is older than himself and knows more, and who grows camellias, Chinese azaleas, and similar plants in a room with a north window where there is no fire heat. He adheres strictly to the principles of watering laid down by the speaker, and, whenever the weather is mild enough, takes his plants out on the piazza in the shade and lets them have a little fresh air, and it is wonderful how it revives them. It is a great privilege to have a window such as the essayist has described, where plants can be grown so much better than directly in the room.

William C. Strong said that he felt a very deep interest in the subject under discussion. He considered it very important, and wondered that house plants are not more generally grown, when their cultivation is so simple and easy. The true way to enjoy them is to make pets of them, and the educating influence on children will be excellent. We are highly favored in our climate, so clear and sunshiny compared with the foggy weather of England, which is so much farther north, and what is done there can certainly be done here. It has been said that plants will not thrive where furnace heat and gas-light are used; but the plant is the best test of a healthy atmosphere, and if it will not thrive, the air is not fit for human beings. If the air is pure we can cultivate plants in

our windows as well as anywhere, and they will afford the greatest pleasure to visitors. Roses can be bloomed in January, as was shown by the specimens on exhibition. What is needed is perfect control over moisture and temperature; and they color better here than in England. Kerosene is difficult to use in the house, because it does not unite with water, but, by beating or churning up one part with two parts of common soft soap, it can be mixed with water, and then forms an effectual remedy for red spider and mealy bug. The speaker had tried this and knew it to be effectual. The proportions may vary from one part of water and one of the emulsion to ten of water to one of the emulsion. For delicate greenhouse plants it must not be as strong as for out-door use. It must be strong enough to kill the insects without injuring the plants, and the best way to ascertain whether it will answer is by trial. The strongest mixture mentioned should be used only on cacti, or to destroy lice on the bark of trees, or on other plants which are not liable to injury by strong remedies.

President Hayes asked for suggestions for overcoming the difficulties arising from gas and furnaces.

William D. Philbrick said that there is a practical way of getting over the difficulty of impure air, which is by building out a bay-window and partitioning it off as the essayist had recommended; but the trouble then is that it is too cold, and to obviate this he recommended carrying a pipe from the furnace, around the floor, or a water-back and heating-coil, independent of the hot-air arrangement. With a miscellaneous collection of half-hardy plants, overheating is most injurious, causing them to grow spindling. The temperature should be from 60° to 65°; and they cannot have too much sunlight. A high temperature is worse at night, or in a dark day, than in bright sunlight.

Mrs. E. M. Gill said that before she had a furnace and gas she had three hundred plants — azaleas, camellias, heaths, etc., — all over her house, but since the furnace and gas were introduced she had been obliged to discontinue their cultivation. She wanted the room in the dwelling for her children. She gave her geraniums to a friend, who grew them so as to be healthy and free from rust, and who also cultivated beautiful fuchsias in a chamber where little heat was given.

Leander Wetherell knew a lady in Haverhill who had about the same number of plants thriving in her sitting-room, and another lady in Deerfield, who was equally successful in cultivat-

ing plants in a room warmed only by a wood fire. Both these collections were exceedingly luxuriant in growth and flowering.

Mr. Strong thought it an important point whether the plants were injured by the hot-air furnace or by the illuminating gas.

Mr. Wilder wished to correct any impression that he might have given that plants can be grown in a room without any heat. Though there was no fire in the room he spoke of, it received heat from the adjoining room.

William H. Badlam thought that if gas from a furnace injured plants, the furnace must be badly constructed or managed, or else out of order. He has a furnace, and his plants look well, but he always keeps the damper open an inch or an inch and a half, to carry off the gas. The damper has in the centre a hole an inch and a quarter in diameter, which cannot be shut.

Mr. Barker thought Mr. Badlam had hit the nail on the head. He agreed also with Mr. Strong that the health of plants is a good indication whether the air of our rooms is healthful for ourselves. He had seen a *Hoya carnosa*, in a back street in Chicago, on a trellis four feet high, which was a mass of bloom. It got its stimulant from the wash-tub. He knew, also, of Gardenias thriving within five feet of the cooking-stove, and of a beautiful plant of *Poinsettia pulcherrima* in a sunny window in Lynn. It is a great mistake to force plants too early in the season; they should be kept along through the winter, until the days are longer and the sun is higher. In forcing grapes when the ground is frozen we work against nature; and he knew an instance where an entire house was destroyed by an attempt to start the vines before the border was thawed.

Mr. Wilder said that the *Hoya carnosa* is a trailing plant, which he would not have supposed adapted to house culture, but he knew a clergyman who had two windows filled with it, and found it easy of culture.

Mr. Strong thought that, with a wrought-iron furnace and a large volume of air brought in from outside, plants could be grown as well as with a wood fire. We can cultivate plants to greater perfection in houses with furnace heat than we can out-doors. He would hail their cultivation in the house as one of the best indicators of a healthy atmosphere. We can saturate the atmosphere with moisture, and we ought to have more moisture in the air of our houses.

William H. Hunt said that he has a conservatory, about eight

feet by twelve, attached to his house, and found it difficult to keep it from getting too hot by day, and to keep it warm enough at night, and he made a frame above the pipes where he put pans from four to six inches deep and two inches wide and filled them with water, placing over them little boxes for plants or cuttings. He now has good control of the heat and a good atmosphere, but he cannot suit the temperature to all plants. He agreed with Mr. Strong that plants can be grown perfectly with a furnace; he knew a lady who did it.

John B. Moore said he believed that he could grow plants with a furnace as well as in a greenhouse. What are the conditions of plant growth? One is freedom from gas, which affects people as well as plants. Chrysanthemums last in his house for a month. Plants cannot be grown in the greenhouse without ventilation. He used to try to grow plants in his house with coal stoves and the chimneys bricked up, but without success. Now he has a furnace and open fires, and they succeed. Good drainage is of the utmost importance. He would add to the three requisites for plant culture named by Mr. Wilder, light, air, and moisture, one other, — something for the plant to grow in. It must have good soil, and there is nothing better than half-decomposed sod. Plants will thrive in it even without manure. It is a great mistake, often made by ladies in the country, to collect the mould from hollow trees and call it leaf mould; the rotten sod is better and much less trouble. After the plant is supplied with soil it can be ruined by watering. We should follow the course of nature, which gives us a good heavy shower, and then sunshine and heat until the plants want water again. A continual drizzle is injurious. You can tell by rapping with the knuckle on the side of a pot whether the soil is in need of water. Last year he only watered his roses twice, and was not sure that he had not given them too much. It is a question whether constant syringing does not induce mildew.

Mr. Wilder said there is no doubt that too frequent watering is very injurious.

Mr. Badlam said that watering is not the only thing requiring attention, — a moist atmosphere is essential. Furnace heat is too dry, except with excessive evaporation of water. To remedy this he plunges his pots half their depth in sphagnum moss, in a tray at a south-east window, and at the joint of the sashes he has a smaller tray. He cultivates a hundred pots of Geraniums, *Manettia bicolor* (though it is difficult to keep the mealy-bug from it), Helio-

tropes, Carnations, Begonias, English, German, and Grape-vine Ivies, Dracænas, Abutilons, Primroses, Oxalis, Coleus, etc., and they all do well with care.

Mr. Barker agreed with Mr. Badlam in regard to the good effect of sphagnum in regulating the moisture. Where we can live is the best place for plants to live. Over-watering is very difficult to manage; it is a greater mistake than giving too little water.

Mr. Wilder said that over-watering rots the roots of plants. He had a gardener who watered his camellias once a day, and they became waterlogged, and dropped their buds, and he let them stand three weeks without water, which was as long as he dared to.

Mr. Philbrick said that some furnaces give as pure air as a wood fire, but many are faulty and leaky. The chief difficulty is in defective draught of the chimney.

Mr. Wetherell asked if there be any specific rule for watering.

Mr. Barker said that the top of the soil in the pots indicates when water should be given. Not so much is required in dull as in sunny weather, and more is needed in the long days than in short ones. By tapping on the side of a large pot it can be judged whether it needs water.

Mr. Strong said that a plant in vigorous growth should have more water than when dormant or growing slowly.

President Hayes said that he built a conservatory on the back of his dining-room, which is not heated by his furnace but by a fireplace. The conservatory has shutters to exclude the gas, but they also exclude the heat, and he was obliged to put in a coil of pipes, which required a separate furnace below, and now, though the conservatory is up high and exposed to the wind, the difficulty is to keep the heat down when the sun shines. It is very important to exclude gas, and he has to shut up the conservatory when the gas is lighted; but with the greatest care he cannot grow plants there as well as he would like to, and has to bring them in from his greenhouse at Lexington.

Robert Manning mentioned the blue Browallia as doing better than any other plant in his sitting-room. Mr. Barker and Mr. Badlam agreed that it is one of the most desirable plants for house culture.

Edward L. Beard thought bulbs very eligible for house cultivation, and that with more knowledge of them we should find them better than Tea roses, etc. Their cultivation is easy and

simple. He imports every year Hyacinth, Polyanthus narcissus, and Paper narcissus bulbs, and after January they keep the greenhouse gay. He pots them in succession for a month, and puts them in a cool cellar, first watering them and afterwards covering them with tan, and has a constant succession of flowers. He commended their culture, though the bulbs must be bought anew each fall. With furnace heat we lose sight of the temperature; 70° is too high; at 60° the plants will struggle along,— but there is every difference between 60° and 70°. At 70° only hard-leaved plants will thrive.

The subject of the next meeting was announced as "Planting Shade and Shelter Trees," to be opened by Leander Wetherell.

BUSINESS MEETING.

SATURDAY, January 26, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

William C. Strong moved that a committee be appointed to prepare resolutions expressive of the sense of the Society on the death of Edward S. Rand. The motion was unanimously carried, and the Chair appointed as that committee Mr. Strong, Hon. Marshall P. Wilder, and John G. Barker.

Adjourned to Saturday, February 2.

MEETING FOR DISCUSSION.

PLANTING SHADE AND SHELTER TREES: WHAT SPECIES ARE MOST DESIRABLE AND THE SOILS BEST ADAPTED TO THEM.

By LEANDER WETHERELL, Boston.

The theme assigned to me by the Committee on Discussion is one of great practical importance to both horticulturists and farmers over this State whose noble name the Horticultural Society bears. It is not anticipated, I presume, by any who have come in hither, that I am to discuss landscape gardening or forestry, as the theme designated does not include either.

"Trees for Shade and Shelter:" the first signifies protection from the burning rays of the summer sun, an important considera-

tion in a country remarkable for the clearness of its atmosphere; the second, trees to screen or protect cultivated grounds from the cold winds from the north and north-west, especially in respect to gardens and fruit orchards, and serving as well for wind-breaks for homesteads and grounds contiguous thereto. Trees that furnish desirable shade for dwellings should, in their selection, be chosen also with reference to their beauty and adaptability to soil as well as for shade, in order that they may be decorative as well as useful, thus combining the beautiful and the useful. In the summer an humble, modest dwelling with a grass-plot before it, shaded by an oak, an elm, or a maple tree, is more attractive to the passer than a showy mansion wholly unprotected by a tree from the burning rays of the summer sun. The pilgrim and the wayfarer welcome trees by the roadside under whose umbrageous boughs they may pause and rest their tired and wayworn limbs; and in their meditations they will hardly fail to remember with gratitude the kindly foresight of him who spared or planted the trees which have contributed so much to their comfort. Trees should, therefore, be planted by the roadside as well as about dwellings. Groups of trees should be provided in pastures where the live-stock of the farm which graze thereon in the summer may find shelter from the heat of the sun.

There is nothing about the old homestead of my boyhood life which I recall with more distinct and pleasant recollection than the four large trees near the house, to wit: a majestic white oak (*Quercus alba*), a stately elm (*Ulmus Americana*), and two large shell-bark hickories (*Carya alba*). A little removed from the house were three large chestnuts (*Castanea vesca*), which, like the preceding trees, were quite notable for size and longevity. The hickories and the chestnuts were good annual nut-producers, and the nuts of one of the hickories were very remarkable both for size and quality. These did much with the chestnuts, apples, and sweet cider to make cheerful the domestic rural fireside in days of auld lang syne. There are few things in early life that become more deeply impressed upon the mind than the memory of notable trees provided by a former generation as decorations of the old homestead.

The influence of trees upon the healthfulness of the atmosphere should be considered by all owners of real estate. Trees, as also more lowly plants, imbibe carbonic acid with other gaseous, volatile products exhaled by animals and the decomposition of organic

matter, and thus do much to purify the atmosphere. Humid air, charged with miasma, is deprived of it by trees, says Becquerel. Localities in Italy were observed by Rigaud de Lille which were preserved from fever by a screen of trees, while other localities not thus protected were subject to fever. This belief, that trees are a protection against malarious influences, is very common among Italians.

Lieut. Maury stated that he believed that a few sunflowers planted between the Washington Observatory and the marshy banks of the Potomac saved the inmates of the Observatory from intermittent fevers, to which they were subject before the planting of the sunflowers. The experiment of Maury has been repeated in Italy. In fact, it is generally conceded that plant and forest screens are a protection against noxious exhalations from marshes and other like sources of malarious diseases when located at the windward of them. The swamps of the South as also those of the Carolinas and Virginia were not unhealthy even to white men so long as the forests remained, but became insalubrious when they had been felled by the woodman's axe.

Scientists now teach us that forests serve as promoters of the health of animals both mute and human. What is poison to breathing animals is food for plants; and trees thus serve to purify the air and to make it health-promoting for both man and beast. In one of the oldest books of the library of this Society it is recorded, "the tree of the field is man's life."[1] The teachings of modern science do most emphatically confirm this quotation. Trees undoubtedly were the forerunners, the John-the-Baptists, of man, and the lower animals, as we are pleased to call the mutes. Therefore enough is suggested by what has been said to demonstrate the sanitary influences of plants, trees, and forests. Let all, therefore, who own land enough to plant a shrub or tree fail not to plant one the coming spring, if they have not already done so. What shall it be? Soil, and adaption thereto, should determine the answer.

This inquiry leads to the brief consideration of the selection of trees for planting: "What are the species of trees most desirable for 'shade and shelter,' and the soils best adapted thereto?" constitute the theme assigned to me.

The first tree I shall name is the Oak, which has not inaptly been

[1] Deuteronomy xx, 19.

called the "King of the Forest." No other tree is so frequently named in the book of Genesis as the oak. The famous oak of Mamre, called Abram's Oak (*Quercus pseudo coccifera*), was recently figured in the Transactions of the Linnæan Society by Dr. Hooker. It is popularly believed to indicate the spot where grew the oak under which the patriarch pitched his tent. The Arcadians believed the oak the first tree that was created. It has a large trunk, and sends out its limbs over the soil: —

> "These monarchs of the wood,
> Dark, gnarled, centennial oaks,"

seem to bid defiance to time. Generations of men succeed generations, while the oak withstands the storms of a thousand winters and more. Herodotus informs us that the first oracle was that of Dodona, dwelling in the celebrated oak grove of that name. The oak was famous among the Romans and was dedicated by them to Jupiter. To come down to our own English ancestors, the Druids, the priests and wise men of the Britons, deemed the oak sacred, and sacrificed under it, cutting the mistletoe from its trunk. The name of "Gospel oak" is still heard in many of the old English counties, pointing back to the time when penitential psalms and gospel truths were uttered beneath their shade. Many trees in fatherland still bear this appellation, though the name has not been newly bestowed for many generations.

The size and age to which the "King of the Forest" attains are noteworthy. Humboldt mentions an oak near Berlin measuring nearly ninety feet in circumference near the base. A tree in the same neighborhood was blown down in a storm in 1857, which measured sixty-six feet in circumference. Their ages have been estimated at from one thousand to two thousand years. Gilpin, in his "Forest Scenery," reports a few venerable oaks that chronicle ages before the Conquest. Of the most venerable of these monarchs is one in Norfolk, reputed to be "the Old Oak" during the reign of William the Conqueror, and said to be fifteen hundred years old, a plate being attached to the tree bearing the following inscription: "This oak, in circumference at the extremity of its roots is seventy feet, in the middle, forty feet." This was in 1820. The King's Oak, in Windsor forest, is represented as having been a favorite tree of William the Conqueror, and the largest in the forest, and is reputed as being upwards of a thousand years old,

measuring, some twenty years ago, twenty-six feet in circumference three feet from the ground. An oak in Dunnington park ran up fifty feet before a limb appeared, the base squaring five feet. An oak in Holt forest in Hampshire measured, in 1759, thirty-four feet in circumference seven feet from the ground. An oak felled at Norbury, as stated by Dr. Platt, was of the enormous size of forty-five feet in circumference, so that, when it was lying upon the ground, two men mounted upon horses on opposite sides were concealed from the view of each other. He also mentions an oak in Keicot, beneath whose branches it was computed that four thousand three hundred and seventy-four men could have stood. The largest sum ever realized from the sale of one tree was that of the Gelonas Oak, a few miles from Newport, Monmouthshire, felled in 1810. According to the "Gentleman's Magazine" for 1817, it was sold, standing, for one hundred guineas, under the belief that it was unsound, and was resold for four hundred and five pounds, and subsequently was sold again for six hundred and seventy-five pounds, and was found to contain two thousand four hundred and twenty-six cubic feet of timber. Its bark was estimated to weigh six tons.

There have been some memorable oaks in the United States, of which two are here referred to, which the writer has seen. The first to be mentioned is the celebrated Charter Oak, of Hartford, Conn., which was visited by the writer in its green old age. It was blown down some years ago. It was a grand old tree.

The Wadsworth Oak, in Geneseo, N.Y., near the River Genesee, was a giant of the forest. It grew in one of the most fertile valleys of the Middle States. The tree was of extraordinary size, and for many years it attracted large numbers of travellers journeying to the Niagara Falls and to the West. Its trunk measured thirty-six feet in circumference, and the tree was a marvel to all who saw it. The writer has never seen so remarkable a specimen of the old forest growth, whether of the oak or other species of indigenous trees, east of the Mississippi river, as was this gigantic veteran. In Flushing, Long Island, formerly grew a rare specimen of the oak. It measured a little short of thirty feet in circumference.

The oak is acknowledged to be the most picturesque of trees. As a shade tree it cannot be excelled. Of the oak family there have been enumerated by botanists more than one hundred and thirty species. Michaux the elder described twenty, and Michaux

the younger twenty-six, species of North America; and Nuttall, thirty-two. George B. Emerson found twelve species growing in considerable numbers in Massachusetts. De Candolle, in his "Prodromus," described two hundred and eighty-one species of the oak growing on this planet.

The first to be named for planting is my favorite tree, the White Oak (*Quercus alba*). Bryant, the American poet, in his "Forest Hymn," says of this oak: —

> "Not a prince
> In all that proud old world beyond the deep
> E'er wore his crown as loftily as he
> Wears the green coronal of leaves with which
> Thy hand has graced him."

The tree needs little description, as it is well known to all present. Mr. Emerson said of the white oak that it is beautiful in every stage of its growth, and is, therefore, a most desirable ornamental tree, and concludes with these words, "Let every one who has an opportunity to do so plant a white oak." He measured one of this species in Bolton that was nineteen feet in circumference just above the surface of the ground, and one in Greenfield that was seventeen and a half feet in circumference. The one referred to as near the homestead of the writer was about fifteen feet in circumference near the surface of the earth. The soil suited to their growth is a strong tenacious loam. There is ample room to suit the most fastidious taste in the oak family.

The next tree to be named is the Elm (*Ulmus Americana*), which is a great favorite, or was formerly, among the people of New England, especially of Massachusetts and Connecticut, where there are still many trees of magnificent beauty and of great size and grandeur of appearance. They are among the early bloomers of spring. The sturdy trunks and graceful boughs are unequalled, as all will readily admit. The memorable Old Elm of Boston Common, recently blown down, as measured in 1844 by George B. Emerson and Professor Gray, was at the ground twenty-three and a half feet in circumference, and three feet from the surface seventeen feet and eleven inches. It is unnecessary to dwell upon the description of the large elms of Massachusetts, as they are well known to many of my auditors. The elm is more easily transplanted than the oak, as it roots nearer the surface of the ground. Some of the most magnificent specimens are still growing along the valley of the Connecticut river in the States of Massachusetts and

Connecticut. It is found in a great diversity of soils, but never, or rarely, in its most gigantic form and greatest beauty, except in rich, moist ground, such as is found along the banks of large rivers, between the forty-second and forty-fifth degrees of north latitude. No other shade tree has been more frequently planted in Massachusetts, unless it be the Rock or Sugar Maple (*Acer saccharinum*).

The Sugar Maple, like the elm, has long been a favorite shade tree in Massachusetts. It is the most notable tree of the maple family. It is found from 48° north, to Georgia, and from Nova Scotia to the Rocky mountains. Its foliage is a dark and beautiful green, and is clean from insects or parasites, which is more than can be said for the elm. It is indigenously common in the Eastern, Middle, and Northern States and is less common in Eastern Massachusetts than in Western, where it is very common. In Blandford, Mass., a rock maple is mentioned by Mr. Emmons that was four feet through near the surface and was one hundred and eight feet high, and when cut, produced seven and a half cords of wood. This was an indigenous forest tree. In Stockbridge, Amherst, Deerfield, Sunderland, and Belchertown are planted double rows of rock maples, which are magnificent decorations of the principal streets. The soil suited to their growth varies. The sugar maple is indigenous to sweet, rich, mountain soils, which, when the forests are removed, produce the richest blue grass pastures.

The Japanese Maples are decorative, and are deemed hardy. The Norway Maple is a fine tree. Wier's Cut-Leaved Maple is a beautiful tree, and may be planted for decorative purposes as well as for shade; it is known by botanists as *Acer dasycarpum*, variety *Wierii laciniatum*. The species is called White Maple. It grows rapidly and is a handsome, clean tree, like all the species of maple. The Red Maple, called also Swamp, Scarlet, or Soft Maple, is a tree desirable for its great beauty in early spring and autumn. Its early crimson or scarlet leaves in late summer and early autumn render it very attractive to lovers of autumn leaves. Whatever may be the cause, the æsthetic effect of the decay of autumn leaves is that of infinite beauty, and our own native poet, Bryant, must have been thinking of the maples when he said: —

> "And when the autumn comes, the kings of earth,
> In all their majesty, are not arrayed
> As ye are: clothing the broad mountain side
> And spotting the smooth vales with red and gold."

Mr. Emerson says of the rock maple: "In Stockbridge, Deerfield, and many other of our most beautiful Western towns, a single or double row of rock maples is the appropriate and magnificent ornament of some of the principal streets and roads. They elevate the public taste; and they may easily be made also to contribute to sustain the public burden." The rich orange tints of the sugar maple in the decay of the autumnal season, blending with the scarlet of the red flowering maple, the crimson of the tupelo and sumach, and the buff and yellow of the birches serve to increase its value as a desirable shade tree.

The Large-Leaved Maple (*Acer macrophyllum*) is a superb tree. It varies in height from forty to ninety feet, and its graceful form, with widely spreading branches, serves to give it a place among the most desirable shade trees.

The White Wood or Tulip Tree (*Liriodendron Tulipifera*) is a tall, upright tree. It is common in Western Massachusetts, in several towns on the Westfield river, particularly in the town of Russell. Michaux says that, in favorable situations in a deep, moist soil, it attains great size, and is one of the largest trees indigenous to the United States east of the Rocky mountains.

The flower is likened by Pickering to a chalice: —

—— "Through the verdant maze
The tulip tree
Its golden chalice oft triumphantly displays."

The Linden or Lime tree (*Tilia*), as an ornamental shade tree, is to be recommended to planters. Its growth is rapid, and it is a good species for shelter planting as well as for shade, whether about the homestead or in the pasture.

The European Linden is a beautiful tree, superior to the American. The lindens, when in bloom, attract honey-bees, particularly the American species, called the Basswood tree (*Tilia Americana*), from which they gather honey of the finest quality. The linden grows to the height of from eighty to ninety feet. Its foliage is beautiful at all times, and particularly so in autumn.

The Beech, the Horse Chestnut, the Acacia, the Chestnut, the Ash, the Black Walnut, the Catalpa, the Larch, and other species of trees will suggest themselves to the planters of trees for shade.

There is no department of artificial tree planting more generally overlooked by gardeners, fruit-growers, and farmers than that of

planting trees for shelter or wind-breaks, to protect plants, shrubs, and fruit trees from cold north and north-west winds, where they are not sheltered by hills, as is sometimes the case. Perhaps, in some localities, north-east and east shelters should be included with the west.

What species of evergreen trees are best adapted for this purpose next presents itself for brief consideration. The first tree I shall name is the White Pine (*Pinus strobus*), called also Weymouth Pine. The bark is smooth and the trunk straight, growing to the height of from eighty to a hundred feet, and being sometimes from five to seven feet in diameter. When young, its branches are whorled, from the surface of the ground upward. It is indigenous all over New England. The late Rev. John Lewis Russell, of Salem, a former member of this Society, described a tree of this species, in Hingham, "which, thirty-two years after it was planted, had grown to the height of sixty-two and a half feet, and measured seven feet in circumference." The Pitch Pine, the Scotch, and the Norway Pine should be named; also, the Hemlock, the Black or Double Spruce, and the White Spruce, the American Arbor Vitæ, the American Holly, the Juniper, the Silver Fir, and the Larch. The last, though not an evergreen, is yet a rapid grower, and should be included among the trees desirable for screens and wind-breaks.

Thus, Mr. President, in discussing the theme assigned me in this series of weekly meetings, I have sought to present it in a practical light, and if I have failed to do so in respect to my selection of the trees named for shade and shelter, yourself, sir, and the members of the Society have the matter before you for further consideration, emendation, and discussion.

Discussion.

William T. Brigham was called on, and said that he had just come from the forests of Central America, where the luxuriance of vegetation was in marked contrast to our own scattered shade trees; but there, as elsewhere, there were solitary trees of great antiquity, whose age was merely a matter of tradition. In the Plaza of Sacapulas stands a Ceiba tree (*Eriodendron*), reputed to be a thousand years old; it is some thirty feet in circumference of stem. At Heliopolis, in Egypt, he had seen a Sycamore tree which the

tradition of Christian and Moslem alike declares sheltered the Holy Family in the flight into Egypt. In the tropics, as the growth is continuous, there are no annual rings, and this uncertain method of computation is not applicable to the living tree. He was able, however, to give the age of one large elm planted by his great-grandfather, William Brigham, in 1727, at the family homestead, in Grafton, Worcester county. Some twenty years ago this was eighteen feet in circumference three feet from the ground, and the branches spread over a circle one hundred and eighty feet in diameter.

Mr. Brigham said that, although the matter was not strictly germane to the subject under discussion, he wished to tell the Society about a garden he found in the highlands of Guatemala. After a journey of some six weeks through the forests and over the mountains of this flourishing republic, he came to the city of Sololá, in the midst of the volcanic district that stretches along the Pacific coast line for many hundred miles. From the Public Garden the view comprised the magnificent volcanic cones of Atitlan and San Pedro, rising from the shores of Lake Atitlan eighteen hundred feet below the level of the plateau on which Sololá stands. The volcanoes of Agua and Fuego were plainly visible in the distance, but, strangely unfamiliar as all this landscape was, the garden was of the most homelike character. In latitude 14° 45′ N., at an elevation of some six thousand feet above the sea, there was but one plant (the orange) that is not commonly grown in our Massachusetts gardens. Indeed, there were not so many tropical species as are found in our northern gardens. The complete list is here: Sweet-peas, which grow over the shrubs to a height of twelve to fifteen feet and blossom all the year; three or four kinds of pelargoniums; carnations of four colors; marigolds, which grow wild here, and are much used for church decorations; campanulas; white and pink yarrow; sweet william in bud in November; four or five pinks; *Dianthus Heddewigii;* chrysanthemums in bloom; white iris; scabious; chelidonium, double and single; princess's feathers, used in churches; poppies; fuchsias; linaria, *Lilium candidum;* œnothera; gilliflowers; gladiolus; antirrhinum; peach in blossom and fruit, in every stage like the orange; sunflowers; abutilons, white, pink, and crimson, growing to large trees; ragged lady; four roses; yellow sweet clover; spider lily; blue African lily (Agapanthus); canna; single hollyhocks; lupins; long-leaved euphorbia; several sedums; wood pink; cypress, like the Monterey;

dahlias; mignonette; violets. A similar though not so extensive a garden was seen at Quezaltanango at an elevation of seven thousand feet.

Of the native flowers, whole fields of Stevia attracted both the senses of sight and smell. The wild dahlias were very fine, often growing to the height of fifteen feet and a diameter of eight feet. A single pink variety was common with stems three inches thick; also white and double white, much resembling a ragged chrysanthemum. These sometimes grew on the long top of *adobe* walls, and appeared to form no tubers, as indeed there would be no occasion for this growth.

Guatemala seems the home of the convolvulus. Fifteen species were noted; three of them excited admiration: one, with flesh-colored corolla, ran over the tree tops; another was of a clear light-blue color, and the third, dark French-blue, with corolla five inches in diameter. Four fine passion-flowers were observed. But October, November, and December are not months when flowers are most abundant here.

William C. Strong agreed with the essayist in regard to the importance of tree planting. There is no doubt that the climate here has been disastrously affected by cutting off the trees; and planting more forest will change it. There is a forest in New Hampshire so dense that the thermometer is higher in it than outside, and robins, quails, and other birds make it their winter quarters. The thermometer is higher in the vicinity of evergreens than away from them. Moist land is best adapted to the growth of forests. He sells more rock maple trees than of all other shade trees together, but does not think it desirable to the extent to which it is used, as sometimes in double rows on each side of the street in towns in the western part of the State. It is clean and free from insects, regular in outline, and dense in foliage, but the uniformity is objectionable, and the sun does not penetrate the dense foliage, and the ground underneath remains wet. In this respect it is only less objectionable than the horse chestnut, which is entirely unfit for an avenue tree. The elm, with its graceful gothic arches, so lofty, light, and airy, is vastly superior to either; but it feeds greedily, and we must be careful not to plant it where it will extend its roots into our gardens. Though the elm is so superior to the rock maple as an avenue tree, it may also be planted in groups. The oak is very desirable. The white maple (*Acer dasycarpum*), and its cut-leaved variety are more rapid in growth than the rock

maple, and less dense but more liable to be broken, and not as long lived. The red maple is desirable for variety, but the Norway maple is the best of all the family; it takes a fine golden color in the fall. The speaker is partial to the black walnut, with its open, graceful, palm-like foliage. We do not want density of foliage, and the maple and especially the horse chestnut are objectionable immediately around the house. We should be very careful what trees we plant very near our dwellings. The Cut-Leaved Birch and the linden are desirable.

Mr. Brigham did not think the horse chestnut so objectionable as Mr. Strong, and spoke of the magnificent avenue of four rows of these trees two miles long, in Busby park, planted by Cardinal Wolsey. The shade of the horse chestnut is not so dense but that grass will grow under it. The Lombardy Poplar is still cultivated in Italy. A cutting planted in 1867 is now a foot in diameter, and as high as the third or fourth story of a house, and shows no signs of decay. It is suitable for city planting, as it will grow on bare gravel.

Mr. Strong said that for certain effects, as, for instance, when a grotto-like effect is desired, there is nothing equal to the horse chestnut. There is one on the Peter Faneuil estate, in Brighton, which is a forest in itself.

President Hayes spoke of the park at Althorp, the seat of Earl Spencer, which is set with trees each bearing an inscribed plate, to denote the planting by successive owners, the first in 1579, with the motto, "Be up and doing, and God will ye prosper," which he thought not yet out of date or inapplicable to tree planting.

C. M. Atkinson said that the man who plants trees builds his own monument; there is no greater blessing that he can confer on posterity. He spoke of a magnificent hickory on the street leading from the Cattle Market hotel to Brighton station, which in autumn is a pyramid of gold, and of the fine Virgilia at the old Winship nursery. He was glad to hear Mr. Brigham speak of the horse chestnuts at Hampton; but they are too gross feeders for street trees, and they drop their foliage early. The elm is most satisfactory for this purpose though the horse chestnut is most gorgeous when in bloom.

J. W. Manning spoke of the Edwards Elm, at Northampton, which measures twenty-seven feet in circumference, and of others measuring from eighteen to twenty feet. The Byfield Elm measures, at three feet from the ground, twenty-seven feet. He showed

chestnut posts from a fence in New Hampshire more than a hundred years old, and still sound, and silver-leaved maples, two years from the seed, which grew from six inches to two and a half feet the first year, and five feet the second year, some of them being at the end of the second year an inch in diameter and seven feet high. He had gathered and planted seed of Wier's cut-leaved maple, and from a quarter to a third of the seedlings were cut-leaved, some being much more finely cut than the parent; the remainder were normal.

F. L. Capen thought the elm a very objectionable tree, from its liability to be infested with canker-worms. The rock maple has the advantage of yielding sugar, and the chestnut, beech, and shagbark produce nuts.

David W. Lothrop spoke of a gentleman who procured a quantity of maple and American and English elm trees for street planting, and when the speaker objected to the last-named variety of elm as being ungraceful in middle and old age, the gentleman replied that it was very popular, or nurserymen would not have so many on hand; while the speaker drew the opposite inference. He would plant the American elm in streets, yet not exclusively, but would intersperse them with maples. They should not be less than forty feet apart. Much has been said of the majesty of the oak; but it is difficult to transplant, and nurserymen do not keep them on hand. He has retained fifteen on his grounds; they are not so symmetrical or graceful as the elm, but are free from insects, and show a healthy, glossy leaf through the hottest seasons. The Silver Poplar, or Abele, grows very rapidly, a tree thirty years old being fifty feet high and seven feet in circumference; but the speaker generally dislikes it, though he might plant it for immediate effect. It will grow in gravelly situations, where few other trees will, and soon makes a dense shade. The horse chestnut is handsome in spring, when making its annual growth, but becomes brown and dingy in autumn. Maples are so varied and beautiful in the autumn that he felt an interest in the question whether or not the poorest could not be grafted with the finest. The Norway spruce is the best tree for protection, and the white pine comes next, — the former grows rapidly, two on his place having grown sixty feet high in thirty-two years.

J. M. McCullough, of Cincinnati, thought too much importance was ascribed to the oak. It can be made into a hedge. It also furnishes tannin; and there is no white oak bark left. If we quit

ship-building it will be of no use to grow oaks. The pine furnishes nine-tenths of all the timber used in this country. The Norway spruce is the most valuable of all trees for shade and roadsides. He would abandon the abele, or silver poplar. He had heard it said that it was the only tree in the infernal regions, and that a switch of it was brought thence by Hercules and planted. He believed the story, for in the West every avenue leading to a grog-shop is lined with it! The Deciduous Cypress (*Cupressus distichum*) makes more wood than any other tree, and it is hardy at Cincinnati. The rock maple is the most graceful tree, except the tulip tree, and is also valuable for timber. The red maple makes hard timber. The ash grows slowly, but makes good timber. Blistered ash is from trees exposed to the sun, and, like bird's-eye maple, is valuable for veneering. The tulip tree is the most beautiful of all, but has only a narrow geographical range.

Hon. Marshall P. Wilder said that the subject under discussion is a most important one. In planting, we must give attention to the location, and what we need the trees for. He liked Mr. Wetherell's suggestion to plant shade trees in pastures, and he agreed with Mr. Strong that a variety of trees is desirable. The horse chestnut is beautiful, but it destroys all vegetation beneath it. The tulip tree is one of the most beautiful on his grounds. He has one with a wistaria climbing over it. The linden is one of the best shade trees. He has a Cut-Leaved Weeping Birch sixty feet high. It is a very beautiful tree, and is becoming more and more popular; but he would not plant many, as the white stems have an effect like monuments in a cemetery. The catalpa is a very desirable ornamental tree. The *Magnolia acuminata*, or Cucumber tree, forms a very beautiful tree. The Ash-Leaved Maple is a tree of fine form, and as rapid in growth as the white maple, and has pretty flowers. Trees afford comfort, food, and health, and grand old trees naturally create in us a sentiment of reverence.

Mrs. H. L. T. Wolcott inquired why nothing had been said of the hardy catalpa (*Catalpa speciosa*). She had been trying to do some tree planting, and had studied the writings of Mr. Sargent, who describes the hardy catalpa as beautiful in flower, and very graceful, as well as valuable for timber. The *Acer Negundo*, or ash-leaved maple, promises to be a great acquisition. She is partial to lindens, but last year they were covered with rose-bugs. Her husband is opposed to pastures, and believes in silos, and consequently she has to do her tree planting by the road-sides.

Mr. McCullough pronounced the hardy catalpa a myth. Catalpa flowers, when fed on by bees, make poisonous honey. The linden makes the best feed for bees, and should be planted for that purpose. The catalpa is indigenous to the Wabash valley, and the wild honey there is poisonous, — not deadly, but unsafe. Catalpa wood is very desirable, and makes good gate-posts; but for railroad ties, the speaker would rather have Osage orange.

Mr. Wilder referred to the Paddock Elms, which formerly stood on Tremont street, opposite Horticultural Hall. The New England Historic Genealogical Society got trees from the James M. Robbins place in Milton, where the Paddock Elms grew, and sent them to the Maine State Historical Society, by which they were planted. It has been suggested that the city authorities should perpetuate the stock in the mall or on Commonwealth avenue.

John B. Moore agreed generally with the essayist but more with Mr. Strong in regard to the choice of roadside trees. The elm is the best of all; its liability to be eaten by canker-worms is no objection, for it can easily be protected from them. As a general rule, with different soils we must have different trees: the scarlet maple is fine in soils adapted to it; but it requires a moist soil, and will not grow everywhere, while the elm is not circumscribed by the limits of a particular soil, but will grow in wet places or in sand-banks. It sends its roots to a great distance, and he believed it would find water if there was any within half a mile. He has an elm tree near his barn, which, at three feet from the ground, girts eleven feet. It has probably sent its roots into the barn cellar. No wind will break the limbs of a weeping elm except when they are loaded with ice. Where maples would be torn to pieces, the elm will make a good tree. The abele is the meanest of all trees; he would rather have a Lombardy poplar, but would rather have both out of sight.

Evergreens are best for shelter, but should be several rods from the point to be sheltered. He cannot make grape vines grow within two or three rods of a wood. The white pine is one of the best for this purpose: it makes a dense shade, and grass will not grow under it. The hemlock is the most beautiful of evergreen; he has seen them in pastures in New Hampshire and Massachusetts wonderful in size and beauty, — five or six feet in diameter, and of perfect shape, with limbs to the ground, — more beautiful than any he had ever seen in cultivation.

Benjamin G. Smith recommended the Striped Barked Maple

or Moosewood, where a tree of small growth — twenty-five or thirty feet high — is desired.

Warren H. Manning thought that most of those present would agree with Dr. Warder that the *Catalpa speciosa* is distinct from the *C. bignonioides*. It has been confused with *C. Kœmpferi*. *C. bignonioides* is not hardy here. Wounds do not heal as readily on the latter as on the *C. speciosa*. The wood of *C. speciosa* is extremely durable. A locality in the valley of the Mississippi was submerged and the catalpas in it were killed, and fifty years from the time of submersion many of the trees were still standing, and the wood showed no signs of decay either in or out of the water. There are two varieties of the Negundo, one making a small and poor shade tree, and the other, a large and handsome one. The latter is planted in Washington. The Scotch elm is not eaten by canker-worms, as the English and American elms are. The oaks, hickories, tupelo, and Virgilia are difficult to transplant, and therefore not as well suited to the wants of the average planter as the rock maple and white ash are. The *Catalpa speciosa* is easily transplanted.

President Hayes recommended the Nordmann's Spruce as most lovely and quite hardy, and spoke of the beautiful tulip trees at Parsons' nursery, Flushing, Long Island, as worth a journey there to see. They rise to the height of forty or fifty feet without a limb.

Mrs. Wolcott objected to the trees mentioned by the President, as being too expensive.

Mr. Wetherell said that he avoided the abele and Lombardy poplar because of the labor involved in keeping down the suckers. Both the European and American lindens are sometimes perfectly defoliated by caterpillars. He was aware of the difficulty in transplanting the oak, hickory, and chestnut; but Professor J. B. Turner, of Springfield, Illinois, showed him a hickory tree which he had transplanted successfully. It had a tap root twenty-five feet in length, which was carefully dug up and replanted, being then coiled in the hole.

A paper on "Lawns and Walks and Public and Farm Roads," by Col. Henry W. Wilson, was announced for the next Saturday.

BUSINESS MEETING.

SATURDAY, February 2, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Hon. FRANCIS B. HAYES, President, in the chair.

William C. Strong, chairman of the committee appointed at the last meeting to prepare resolutions in memory of Edward S. Rand, reported the following: —

In common with the public the Massachusetts Horticultural Society has been pained and shocked by the disaster which befell the steamer "City of Columbus," and especially so upon finding the name of one of our esteemed life members, together with several of his family, among the lost. It is therefore

Resolved, That, in the death of Edward Sprague Rand, the Society has lost one who has rendered it valuable professional services, and who was in former years a Vice-President for several terms, and largely interested in our art, giving the same exact care to the culture of his trees and plants as characterized him in the pursuit of his legal profession, thus conspicuously illustrating the only basis of real success.

Resolved, That while the sudden and appalling end of his plan in seeking a more genial winter home is a shock to our nature, yet we recognize a kind Providence in translating one who was so well prepared, with the briefest apprehension or pain, to that land

> "Where the tree of life is ever vernal,
> And the pleasures are immortal."

Resolved, That we extend our sympathy to the surviving friends in their deep sorrow.

WILLIAM C. STRONG,
MARSHALL P. WILDER,
JOHN G. BARKER,
} *Committee.*

Mr. Strong said that those who had been members of the Society for the last twenty years would not need to be reminded of Mr. Rand's character. As a lawyer he was prominent in his specialty as a conveyancer. At one time he was one of the largest contributors to our exhibitions, and took as many prizes as any

one. He brought to the culture of his plants the same care and exactness that he exercised in his profession. His collection of orchids was one of the largest of the time, and a large part of it was donated to the Botanic Garden. We have known of his pecuniary misfortunes, and that he surrendered all he had to meet his obligations. He has done a noble life work, and left an example for us to follow.

John G. Barker concurred in all said of Mr. Rand in the resolutions as containing in a small compass all necessary to be said. In character he was a true gentleman; and he was a much respected and esteemed member of the Episcopal Church, and received its highest honors as a layman. The speaker had charge of his place when he was most extensively engaged in horticulture, and preserved all his premium cards. He took all the first prizes for plants, his collections including the *Medinilla magnifica* and *Cyanophyllum magnificum*. His collection of orchids was excellent, and his estate was a model of neatness. His character shone in all that he did, and he appreciated all that was done for him, and the speaker was glad to have the opportunity to bear witness to his worth.

Hon. Marshall P. Wilder said that it would appear very strange if he did not rise to speak a word in regard to Mr. Rand, whom it was his privilege to know for more than half a century. He was a true Christian gentleman, lovely in his character, — modest, tender, and unassuming. He was the legal adviser of this Society, and an extremely prudent counsellor. He felt a lively interest in the Society, and while Vice-President kept up the practical culture of plants at considerable expense, and brought to our exhibitions many fine specimens of new and rare species.

President Hayes added a word of testimony to the uprightness and excellence of Mr. Rand's character. He knew his father, and knew how he was brought up. He was a profound believer in Christianity, and could go down to his grave unfalteringly. He was a scholar, a lawyer, and a lover of nature, and in all relating to the Society, and especially in regard to the library, he was adapted to be of eminent service to it.

The resolutions were unanimously adopted, and it was voted that a copy be sent to the family of Mr. Rand.

The Secretary presented a circular from Parker Earle, President of the Mississippi Valley Horticultural Society, inviting coöpera-

tion in the International Exhibition of Fruits, to be held under the direction of that Society, in connection with the World's Industrial and Cotton Centennial Exposition, in the city of New Orleans, commencing on the first Monday of December, 1884, and continuing six months. The subject was referred to the Executive Committee.

LEVI W. HASTINGS, of Brookline, and
THOMAS A. WATSON, of East Braintree,

having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society.

Adjourned to Saturday, February 9.

MEETING FOR DISCUSSION.

LAWNS AND WALKS: MAKING AND KEEPING THEM IN ORDER; PUBLIC AND FARM ROADS: HOW SHALL THEY BE MADE AND REPAIRED?

By Col. HENRY W. WILSON, Boston.

The word "lawn" originally signified a bit of untilled grass land or glade in the depths of the wood, which was sung by the poets as a very pretty and sentimental sort of thing. Then it was sought to be produced nearer home, to heighten the landscape effects and add a new charm and dignity to the residence.

It is no exaggeration to say that there is hardly anything about the estate, whether it be large or small, which so completely marks the style of the master of the place as the treatment, appearance and adornment of the lawn. Not every owner is the master of his place, and the general surface, appearance and surroundings of the lawn indicate with unfailing accuracy the style and manner of the man who reigns over it.

The lawn is, and will always continue to be, the most attractive and fascinating feature in landscape gardening, and to harmonize its trim, clean, and velvety appearance with the more rugged and unbroken foliage of the evergreens which border it, is the most gratifying success of the gardener. To some people any bit of grass is a lawn, and one kind of grass looks as well as any other, only it would seem as if the coarser the grass and the rougher the surface the more natural it appears to them.

The principle which should guide in the treatment of the lawn is

very different from that which directs all other attempts to beautify and adorn the grounds, for this reason, that, when the ornamentation sought is by the introduction of trees, we select the most perfect types of their species, so that the copse or plantation will assume a truly natural appearance. A weeping tree seems to me to be as much out of place in a conspicuous position on a lawn as would a fir tree beside a fountain; but some people have a passion for weeping trees.

On the other hand, the lawn, in its perfection, is purely artificial in everything that marks its distinguishing characteristics. The surface must be made as smooth as it can possibly be made; this condition certainly is not natural in New England. The turf is cultivated simply as turf, and not for the natural functions of vegetation, to grow as grass and furnish forage; in the most brilliant rays of a midsummer sun it must not sear or blanch; it must be simply a velvety carpet of living green from early spring time until the coming of frost and snow. Besides, the designer must have the art to conceal its truly artificial character and make it appear that this elegant, emerald surface, which should be soft and delicate enough for a fairy dance, is the most natural thing to expect to find, set right in the midst of its fringing plantations of evergreens, and that the residence was only put where it is that the owner might take this bit of loveliness all in.

The first thing to do, after having determined to make a lawn, is to establish its size. There are lawns, and there are simple grass plots which their affectionate owners fondly dignify by that name.

Men strive to magnify the importance of everything nowadays. They buy a country house, with a couple of acres of land, and at once it becomes an "estate;" a young fellow obtains the employment which he has craved and diligently sought, he "accepts a situation." Singers no longer sing, they "render a selection;" they are no longer singers even, they are absorbed in that mystical word "talent." The musician once played upon his harp or piano or organ, he now "presides." Every little pond is a lake. Now when we attempt the decoration of nature we must leave falseheartedness and fustian alone.

A lawn must necessarily be of such a size that the proper treatment in harmonizing its surroundings will not dwarf its appearance and cause it to look like an oak-opening in the woods; but when, as is often the case, the lawn comprises hundreds of acres, and, with its plantations, assumes the character of a park, no specific rules

can be laid down, as each case would require special treatment; but one thing must be borne in mind, and that is, that the hand of art must be so carefully concealed that the most artificial embellishments will appear to be some of the beauties of nature.

I have in my mind a bit of grass land, which its owner thinks to be a charming lawn, of a couple of acres. Much pains are bestowed upon it; it is freely sprinkled with a hose during the hot dry weather; it is as flat as a pancake, and is bordered by rows of mingled evergreen and deciduous trees that stand out as stark and stiff as a line of marines at a ship's gangway. Unless the area of the lawn be adequate for proper treatment the term is simply a misnomer.

It must be of living green. This is attained only by the proper management of the moisture in the soil. Grass roots will penetrate to the plane of permanent moisture and no farther, and, provided that plane is at as great a depth as four feet below the surface, no drouth or sun can wither or sear the turf if all else is properly and well prepared.

The next thing to decide is what the slope and character of the surface is to be. Most lawns are surfaced to a true plane and generally have the appearance of sagging in the centre. This arises from an optical illusion, whereby perpendicular parallel lines appear curved toward each other, and a flat horizontal surface appears concave.

To correct or obviate this defect, which is really a blemish, the surface should be planned so as to give a gentle swell to the ground, which, by a careful study of the contours before starting, can be accomplished with very little difficulty. The change in the appearance of grounds, by attention to this little detail, is as great as the difference in the appearance of a man stooping or standing erect.

The next point to consider is the drainage. If the land is dry and gravelly its drainage will be natural enough without any artificial aids, but the difficulty of making a proper lawn is greatly increased thereby.

If the subsoil is of a gravelly clay or hard-pan, as much of our New England lands are, it will be found to be indispensable to drain with proper pipes laid four feet deep and thirty to forty feet apart, according to circumstances. This will dispose of the surplus water and suffer the grass roots to penetrate to such a depth, in search of moisture, that they will be sure of finding it at all times.

I shall assume that this part of the work is intelligently planned and executed faithfully and properly.

If the soil is rather light and underlaid by gravel, it will be difficult to make a lawn to stand protracted dry weather, but it can be greatly improved by spreading from two hundred to three hundred loads to the acre of any kind of clayey material, which, if left to the action of the frost during the winter, will become disintegrated and friable, and, in the spring, ploughing it in as deeply as can be done with the best plough and team attainable.

The selection of this material is important, for not all clay will answer, although most kinds will; but the test of its excellence is that the action of frost must thoroughly pulverize it to a complete powder. A perfect incorporation of such material with a dry, sandy or gravelly subsoil, works a wonderful change in its texture; it becomes more retentive of moisture, thus contributing to the object to which all our labor is directed, that of giving permanence to the verdancy of the lawn.

A good dressing of peaty muck will do much to give body to such a soil when treated as described. If the soil is light, you will acquire an addition of pure vegetable matter, which should be comparatively free from nitrogen, as this element would unduly stimulate its solution, and the consequent rapid growth of the grass; this is not desirable. All mud is not muck, as the word is used by agriculturists. Many men, failing to note the distinction, have spent their labor on worthless material, as the boy did who mistook the pignut for the walnut, and gathered his bag full. No man who ever tried pure vegetable muck from the swamp was ever disappointed, and, if he mixed with it a bushel of salt and a barrel of lime to three cords, he obtained as good a material as he could possibly put upon the land to promote the growth of blue grass and white clover. Perhaps the best way to do this is to make the salt into a brine, slack the lime with the brine and then incorporate the powdered hydrate of lime with the dried muck, which will be greatly improved if it has lain exposed to alternate freezing and thawing during the winter.

If the subsoil is a bowlder clay or hard-pan, the easiest and cheapest method of loosening it up is by deep ploughing, running the plough three times in the same furrow if necessary, and by this means a depth of two feet or more can be reached, and the grass will be enabled to stand the drouth exceedingly well, more especially if the land be underdrained as recommended. After the

surface is well pulverized and harrowed, seed down with not less than three bushels of mixed blue grass and white clover to the acre, say two and one-half bushels of blue grass and the rest clover and fragrant vernal grass. Some persons would add timothy or red-top, or both; but there is no need of so doing, as those first mentioned are all the grasses which are necessary to cultivate, and the quicker you get them established the better.

When the very perfection of a turf is desired, and the cost is not restricted, establish the grades which you desire the surface to have if any change from the present condition is desirable, and then trench the soil from two and one-half to three feet in depth; the last will give the most perfect satisfaction, laying the drain tiles as the trenching proceeds. This will be done the more easily, as the trenches for the drains would have to be only one foot deep if the trenching is carried down three feet.

If this work is properly conducted, when it is finished, the lawn is all drained, surfaced and ready to be seeded down.

Some have recommended a hoed crop to be cultivated on the lawn for the first year, for the sake of the tilth. It is true that this might enrich the soil and give a stouter growth of grass; but it is verdure that is wanted and not hay; besides, the enrichment of the soil will prevent the very fineness of texture in the grass, which it is desirable to obtain, as the great beauty of the lawn when established; furthermore, one year is practically lost in the cultivation or cropping of the land.

Another suggestion which is offered, and often followed, is, to sow oats or other grain with the grass. This is probably thought to be best because it is often done where grass is to follow grain as a crop, and it is thought that the grass becomes better established; but no beneficial result was ever obtained by thus sowing a lawn. If grain is sown it will only occupy ground in which grass roots should be getting established, and where they must finally grow after the grain is gone; the continual cutting to which it will be subjected will prevent the grain from furnishing any protection to the grass, and it will only tiller out into broad spreading plants and rob the proper grasses of their food.

Sow nothing but just such seed as you desire to cultivate. If the soil is good average land, treated as described, no manure as fertilizer will be recommended; but let all the wood-ashes, leached or unleached, and all the old lime rubbish that can be obtained, be spread over the surface and carefully incorporated with the soil.

Endeavor to sow the seed just preceding a change of the weather which indicates rain. After sowing harrow in well and roll with a garden roller.

As soon as the grass is well started roll it one day and cut it with a lawn mower the next day; follow this up every ten days and, if the lawn can be finished during the month of May, by autumn you will have a good velvety turf, whereas, if mixed grass and grain were sown, the stouter and more robust grain would have so robbed and overshadowed the weaker grasses, that at the end of two years you would not be so well off as at the end of the first year by the above treatment. The better way is to plant just the grass you want and get it established as speedily as possible.

Thorough drainage and deeply stirring and pulverizing the soil are the two principal secrets in obtaining perfection in a lawn. Any one can cut grass when it grows, if it can only be made to grow.

It will be found economical to thus thoroughly prepare the soil for a lawn, if a perfect and unfading one is desired. Few persons stop to think of the constant expense that is entailed if constant watering with a hose is required in dry weather; and, besides, the grass will not be as vigorous as when by deep tillage the roots are enabled to draw their own nourishment in the natural way.

Boundaries. — Most lawns bound on the highway, and too often are fenced on one side or more with the old bowlder stone wall.

If the lawn is on a level with the top of the wall, thus hiding it from view, there is no comment to make; but if not, then the sooner the wall is put out of sight the better. Next to an iron fence about a cemetery lot, a stone wall around a lawn is the least attractive thing that can be imagined for such a purpose, and, if a fence must be maintained, let it be of wire, with light iron rod or gas-pipe standards. It looks rather more ample and generous to merge the surface of the lawn in the sidewalk, as if it were a part of the grounds themselves. The practice of discarding boundary walls and fences, between the highway and the lawn, is becoming more general, and has many pleasant features, with many drawbacks, which are largely the result of local peculiarities, prejudices, and misdemeanors.

It will be well to border the lawn with a plantation of trees. The manner of doing this is to be determined by the views to be obtained from the house, which control every other consideration; but if

views of distant scenery or of the water cannot be incorporated into the vistas of our lawn, then it is the better plan to make bordering plantations of evergreens, planting them with an irregular margin of smaller trees and shrubs, forming inviting nooks, which are delightful for their sunny warmth in the chilly days of spring and fall. If the trees are well grown, so that they throw out their branches close to the ground, the surface of the lawn will seem to merge in the foliage of the trees with a delightful illusion.

Some people have a great fancy to plant irregular beds of flowers in the lawn. This of course is a matter of taste purely, but it does seem to destroy the beauty of the lawn, which is in a swelling, unbroken carpet of green. The shade of the trees on the north side of the lawn, however, affords an excellent place to plant beds of roses where they can be protected from the unwonted brightness of the sun both in summer and winter.

Top-dress the lawn with well-rotted compost, wood-ashes, phosphates and ground plaster whenever the health and vigor of the grass may require, using your judgment in the matter of feeding the grass when it seems to need it, just as you would feed anything else. By continually rolling and cutting, a thick turf is assured and a permanent unfading lawn is yours.

There is a great difference in taste as to the introduction of statuary upon the lawn; in fact, tastes are often a matter of fashion or of cultivation any way, just as one learns the use of unnatural things or becomes addicted to any habit; so the taste may be educated, but, at the same time, not elevated or purified.

It may be a mark of a cultivated taste to grope around among the ruins of a heathen civilization and drag out of their mouldering heaps the lascivious and licentious statues of the days of their depravity and degradation; to go into ecstasies of delight over the exquisite modelling of their figures; to expend large sums in their purchase and in the erection of costly temples for their preservation; and to call this all a love of art, if it be, it is neither elevated, nor pure, and, after all is said and done, you have only a lot of rubbish which, if left exposed in the street, would render you liable to indictment and your collection to destruction as offensive to good morals.

The Greeks and Romans introduced statues into their gardens, and therefore some will always maintain that it is correct for us to do the same, making no account of the great difference and un-

suitableness of our climate for the introduction of statuary into ornamental gardens. If there is anything in the world that looks cold and stiff, it is a marble statue on a lawn, or a dog standing at an everlasting point at invisible game, or the effigy of an orator, mutely calling upon the Olympian Jove to strike down his uplifted arm, or apparently uttering words to that effect. Downing has quoted very aptly in this connection some appropriate lines from Pope in sarcastic allusion to the same freaks of fancy in his day: —

> "Statues growing that noble place in,
> All heathen goddesses most rare,
> Homer, Plutarch and Nebuchadnezzar,
> Standing naked in the open air!"

Works of art are very difficult things to harmonize in ornamental grounds. A well-designed fountain is a pleasing feature in the centre of a lawn, that is, if it is a fountain designed for water and not to show the skill of the artist, the stone-cutter, or the iron-founder; or an abject thing in a drizzle, like that in the Public Garden.

It requires a great deal of skill to handle water properly in the form of fountains for purposes of decoration. The most famous jet in the world is the Emperor fountain, at Chatsworth, which plays one hundred and ninety-five feet in a solid stream. The volume of water required is so vast that it can be used only upon perfectly calm days, or the wind would blow the masses of spray over the surrounding lawn and do a great deal of damage; it gives one an idea of immense power but not of beauty. There are many forms in which a much less volume of water would produce finer effects for decoration. If excessive quantities of water fill us with a sense of force and power, so a diminutive or inadequate supply seems to me altogether trifling and puerile.

Choice vases, judiciously disposed about the grounds in chosen spots, are not only ornamental but useful, when filled with tender or trailing plants that cannot well be set out in the border, and aid to heighten the effect sought to be produced.

If you have a passion for rock-work, beware that you do not make an imitation of a rubbish heap. Use natural, moss-grown bowlders, in irregular masses, with ferns and trailing vines, and don't be too ambitious.

There is a benefit in cutting the lawn as often as possible before

anticipated rain. The removal of the foliage of all plants reduces their power to resist the heat of the sun or the dryness of the air, and if the cutting be followed by showers, or by a thorough irrigation, the turf will rally more quickly from the shock of the cutting.

The blue grass and white clover are, without doubt, the finest plants for lawns, from the beauty and thickness of the turf which they make, and their delicious fragrance when mown; they are both fond of calcareous soils, and the only way that fondness can be met in New England is by a free use of lime while making the lawn; two hundred bushels per acre would not be an excessive quantity for the soil when it is trenched or subsoiled. At least two bushels of plaster per acre should be used, with the annual top-dressing.

This liberal supply of the natural element in the food of these plants will insure their luxuriant growth. Cease cutting the lawn early in September, and let the grass form an adequate cover to protect the sod against any vicissitude of winter.

Avenues and Paths. — These are located and constructed either for utility or ornament. When for use entirely they should be as direct as possible, without unnecessary windings or detours. When either is made as an adjunct to ornamental grounds, some people fall into the error, that, because a great artist once said that "the line of beauty is a curve," consequently all things crooked must be pleasing and therefore ornamental; so they proceed to lay out their avenues upon this principle and introduce their curves with perfect abandon, the seeming excuse for a crook here being that there was a corresponding or a worse crook somewhere else.

At all points where avenues deviate from a direct line there should be close plantations or a clump of trees, sothat it may appear to be the most natural thing in the world that the detour was necessary, even though when understood the matter appears to be no plainer than the reason for the pond upon the Public Garden, — not that the water was especially attractive or that the pond itself is either very beautiful or essential, but it made the building of a bridge necessary to cross it, and that is reason enough, for which we should always be sufficiently grateful.

The location of our walks and avenues thus subsides into a matter purely of taste, and there we all differ; but their construction is as purely a matter of fact, and in that all must agree, for facts are stubborn things.

Water is the bane of an avenue; as ordinarily constructed it saturates the earth of which the avenue is made, swells the clayey subsoil when frozen, and leaves it a perfect mortar-bed in a thaw; altogether the two principal things for a properly constructed avenue to resist are the wear of travel above and the flow of water beneath.

After the location of an avenue or path has been decided upon, the customary plan has been to dig up the turf and loam, filling the shallow trench thus formed with any clean material that may be convenient, without much attention being paid to its selection, but the surface is raked and rolled until it looks as fine as a daisy. This has been the case in most instances that have come under my observation.

The interesting experience with this sort of work comes in the spring-time, when the walk becomes a sort of a blind drain for all of the moisture of the surrounding soil to run into, and is little better than a puddle. The clayey subsoil, which is our commonest sort, absorbs water like a sponge and swells surprisingly; when frozen it is all ridges and ruts, but when the frost leaves it, — either occasionally during the winter or finally in the spring, — it gives us more discomfort to the square yard than can be endured with equanimity.

After enduring in impatience, and trying the various remedies suggested by drain diggers and contractors, the difficulty is generally got over by laying a plank walk, or the use of a composition of gravel and mineral pitch or asphaltum.

Now, one-half of the labor and expense required to lay a plank or composition walk would construct one of equal width that would be smooth, hard and dry at all times and seasons. If a simple path is all that is required, three feet may be adequate; but a walk should be of ample width for two persons to walk abreast, which calls for not less than five feet in width.

In making simple paths or walks, of three to five feet in width, cut a clean trench twelve to fifteen inches in depth, according to the nature of the ground; then lay an inch drain tile in the middle of the cut, care being taken to avoid sags in the grade, either of the walk or the drain, but, when unavoidable, be sure to have a sufficient outlet at the lowest point. Obtain good, coarse, gravel, and screen it twice, using the coarsest for the bottom, the second next, and the reserve finest for the top layer. Upon the second layer put a thin covering of binding gravel, so called, about an

inch or two in thickness; this kind of material is simply a glacial drift, composed of mingled clay and sharp, angular, unwashed gravel; it packs firmly together and makes a covering perfectly impervious to water; upon this put the final coating of fine gravel, and roll carefully and well.

A walk so made can be done for less than any plank or composition walk of equal width; it will not decay in a few years, like wood, or smell of the gas-house like the composition, but in all seasons and all weathers it will be a sound, dry, beautiful walk.

If anything, the color of our gray gravels will be found more agreeable to the eye and the absence of heat will be more especially discernible to the foot than with the composition walks which are laid in such quantities in all of our suburban towns.

For an avenue which is expected to endure the wear of vehicles the preparation should be somewhat deeper and more thorough, although the mode of construction is substantially the same.

The excavation should not be less than eighteen inches deep; some recommend surfacing the bottom so as to leave it crowning, with the highest point in the middle. I have tried this method with good results, but the plan which was successful under the worst circumstances is to make the excavation the lowest in the middle, and lay a drain tile along the centre, increasing the diameter of the pipe, as we proceed in distance, from the very highest part of the walk or avenue.

The first nine inches of this excavation make a nice place to deposit the old walls and rough stone to be found everywhere in Massachusetts.

If the stones in the wall are too large don't waste labor in trying to break them up; almost any contractor will take them away and return you an equal or greater bulk of chip stone ballasting from the quarry in their stead. Do not let a laborer of a truly scientific turn of mind spend his lifetime in trying to solve the Chinese puzzle of fitting these stones together into a sort of mosaic pavement; it will be useless, if he lives to succeed, and the excessive cost will make it anything to you but a joy forever; the perpetual puttering that is spent upon this kind of work, at this stage, is what occasions the enormous cost which deters so many from trying to have a truly fine avenue.

Let the stones remain where they are dumped, and take pains to see that they are dumped carefully, and so disposed afterwards as to present a tolerably fair surface and no more. Over this foun-

dation lay screened gravel, exactly as directed for walks, and the avenue is completed, only you may need a heavier roller.

In selecting gravel avoid all that has a washed or rolled and pebbly appearance; such gravel will never become compacted and afford a smooth, hard surface, but will be always loose and mealy.

Gutters not only give the avenue a nice and proper finish but prevent the continual wash which ultimately renders the margins of the avenue unsightly, without continued repairs, the necessity for which should be avoided.

It will be found desirable to introduce catch-basins at intervals, particularly at any change of grade, to allow the surface water to pass off by an underground drain, which, in some cases, should have a connection with the drain beneath the centre of the avenue. This is a detail to be specially studied and will vary with circumstances.

The surface of all avenues should be crowned slightly, and only sufficiently to cause the water to flow away easily without washing in a violent shower.

The construction of first-class avenues and walks will thus be seen to be a very simple matter, dependent entirely for its success upon the supervision that is given to the work, and in no way commensurate with the price you pay for it. Carelessness at a critical point may render the whole useless and the expenditure thrown away.

Many persons are continually disturbed by the growth of grass in their walks and avenues. If the material has been well selected it will not afford much encouragement for grass, and nothing should be put into such work that will afford a support for any form of vegetation, but a great deal of loamy subsoil is used for the surfacing of walks because it will roll so nicely and compactly, but this material is soon prepared by the action of the elements to support a luxuriant growth of grass. If much of this material has been used it will be continually muddy in wet weather, and the cheapest way will be to strip it off and put on selected gravel properly. Should the trouble be not great the grass can be subdued, and no harm done, by a light sprinkling of fine salt, or with salt-water, once in a while, which will prove to be a sovereign remedy. By attention to these suggestions, perfectly dry, clean and satisfactory walks and avenues may be secured at a minimum cost.

For farm roads and highways, the same principles which I have

indicated must be observed, except that the degree of elaboration, in each instance, will be controlled by the amount of travel to be provided for and the kind of material convenient for use; but, in all cases, you must guard against water above and beneath. The stones which are so carefully excluded from the road and piled against the wall should make the foundation of the road-bed, and, if it is properly prepared, it will last for a generation.

No plough should ever be put on the highway, and the fine sand or loamy material which has collected in the ditches beside the road should never be put upon its surface. It is rare in New England that the line of a road upon the high ground does not run in close proximity to the best material for road construction.

In wet ground the labor of building the road is increased; but it must commence with the exclusion of all vegetable material and the water; without this all attempts to construct a proper way for teams will be in vain. Through swamps no rules can be laid down beforehand, and gumption is the highest requisite for success; but the thorough drainage of the ground is still the principal thing to be done. If water is entirely excluded and the most substantial material obtainable is used for the surfacing, there need be no trouble or complaint about a road anywhere, and it can be depended upon that undue economy, in the first instance, in preparing the foundation of the roads, is the dearest policy in the long run; it only entails continued expense for repairs and restricts the amount of draught of the teams hauling over it. It should be continually borne in mind that, other things being equal, that road is the cheapest upon which a team can draw the heaviest load, and that the limit to the burden is the weight which the team can haul through the softest spot or up the steepest grade. If these things are constantly kept in mind, by those having the charge of town-ways, a great improvement would be speedily noticeable in very many places. I have made no mention of grades, as it is presumed that any one would easily perceive, from every-day experience, that steep grades are detrimental and by all means to be avoided. It was long since demonstrated that it is easier to go around a hill than over it. But I am sure that if the labor necessary to overcome the physical difficulties in road construction be guided by the principles which I have indicated, there will be no trouble in building, using, and maintaining highways.

Discussion.

Charles M. Hovey was called on, and said that Col. Wilson's paper was so exhaustive that it could not be further elaborated or added to so as to be of benefit. He agreed with the essayist in regard to the use of vases, statuary, and rock-work, and said that we owe him our thanks for the views expressed on these points. Great care should be exercised, in the use of statues especially, not to undertake too much. A little plot of not more than two hundred feet square, by a cottage, denominated a lawn, with a pile of rocks, having a pipe at the top, with a little drizzle of water, shows a demoralized and not a cultivated taste. Drooping trees are often planted in the centre of a lawn; but nothing can be more out of place: they should be around the edge. Curved lines are very beautiful; but walks should be straight, and not curved, when there is no reason for departing from straight lines. Asphalt walks are reminiscences of gas-houses. Trees on lawns should be so planted as to be deemed an improvement and heightening of the natural beauty of the scene, and at the same time to conceal the hand of art. The terms "picturesque" and "gardenesque" have been used to denote two differing styles of planting, the picturesque being crooked and irregular; but it is impossible to define such points exactly. Loudon used the term gardenesque to denote a beautiful rather than a picturesque style. Another authority says that any scene that will make a picture is picturesque.

In regard to seeding, Mr. Hovey differed somewhat from the essayist. He would not use so much white clover, — perhaps not any, but would use Rhode Island bent grass in preference, or would make the greater part of that grass, with a little blue grass. Do not plant any grain with the grass, for the gain is not half so much as the loss. Some would scarcely water a lawn at all, while others would set the hose, and let it run; the latter looks best for a time, but so much water keeps the grass growing too late in the fall, and soon dead patches begin to appear. He had known lawns greatly injured by too much manuring. A lawn well made in the first place does not need more than ordinary care.

Col. Wilson said that his purpose was to describe a lawn that would need no watering and no care. He has a croquet ground prepared in this way; it is purely artificial, and has had no watering or top-dressing for ten years, and stands wear and drought.

J. M. McCullough said that the Kentucky blue grass is *Poa*

pratensis. He recommended the meadow fescue (*Festuca pratensis*) and sweet vernal grass (*Anthoxanthum odoratum*) with red clover; the last not so much for the eye as for the support of life: it will fertilize the ground and purify the air.

Col. Wilson said that thirty-four years ago A. J. Downing recommended the same kinds and quantities of seeds that he had advised for a lawn, and he had always used the mixture and found it good.

Rev. A. B. Muzzey, said that he never heard such a paper as Col. Wilson's read without reproaching himself for not coming oftener to these meetings. He spoke of the danger of departing from nature and introducing artifical things, as at the gardens of Versailles and St. Cloud, where no tree is allowed to grow in a natural way, and which had little charm for him. He was pleased with the paper for the simplicity with which it followed the order of nature, and he asked why we should import ornaments for our gardens from Greece or Rome. The Massachusetts Horticultural Society has done, and is destined to do, a great deal in keeping things in conformity with republican principles, and in preventing people from copying miserable fashions from France, as many have been copied, and some persons think must be, because it has always been so. Do not plant according to what somebody else does, but go out on the hills and fields and observe the order of nature.

Hon. Marshall P. Wilder said that he was pleased and surprised at the excellent and elaborate paper that had been read. His own experience confirmed what had been said by the essayist and by Mr. Hovey. In making a lawn we should begin with proper drainage and thorough preparation of the soil, and should sow plenty of seed of the right kind. He did not like prepared mixtures, but thought they had worked great mischief, and had abandoned all but Rhode Island bent grass and white clover. He was pleased to hear what was said in regard to statues and other improper ornamentations, which are always distasteful to a correct eye, but was a little surprised at the objection to a vase or plot of flowers in the centre of a lawn, and was glad to be instructed. He had a flower bed in the centre of his lawn, but should remove it, recognizing the objection as a just one.

John B. Moore said that he was pleased with Col. Wilson's paper, but not surprised. He liked what was said in regard to statuary; he objected to the statues of heathen gods and goddesses,

and particularly when they have no clothes on. He has a piece of grass which he cuts frequently and keeps to look at, and had tried two mixtures, which were not half as good as blue grass and clover with Rhode Island bent grass. As to the treatment of lawns, in November out goes from the city load after load of coarse manure, which is spread on lawns, and looks and smells badly, and is detrimental to the grass, bringing in weeds and inducing coarseness. It is much better to wait until spring, and then give a dressing of wood ashes.

Mr. Wilder approved the warning given by the last speaker against dressing lawns with stable manure. It had cost him hundreds of dollars to extirpate the weeds brought into his lawn in that way. He advised the use of chemical fertilizers on lawns.

Benjamin P. Ware said that, in regard to the building of roads, he would emphasize the very judicious recommendations of the essayist concerning drainage. This should be from the higher to the lower portions of the highway, and could be effected at little expense in building. It might also be done to old roads and be of lasting benefit.

Leander Wetherell said that he was a strong advocate for blue grass (*Poa pratensis*), known also as spear or June grass. No other species makes so fine herbage as Kentucky blue grass, and it is superior to all others for lawns. It seeds in June, and after that furnishes a green and most luxuriant growth of spear grass. Brutus Clay told him he had plucked a spear three feet in length. It does not seed the second time in the same season, as timothy does. He would on no account use clover of any species for lawns, but would not object to a little Rhode Island bent grass. He believed in thorough under draining for walks and avenues; when well drained, a walk will remain in good condition. Compared with this method of building roads the common method is costly and extravagant. Drainage is especially necessary where a road is wet and inclined to be muddy.

President Hayes said that when he began to make his lawn the ground was full of large bowlders, and there was an apple orchard in the front part, with hillocks around the trees. He dug up the apple trees and hundreds of tons of stone, and afterwards added a wood with pitch pine stumps. He ploughed and manured the ground, and procured grass seed of Messrs. Hovey, which did very well. He afterwards covered the lawn with wood ashes, which produced an abundant growth of white clover. The

lawn is in two plateaus, and he had carted in thousands of loads of loam to make the upper plateau. He does not water much, as it does not compensate for the trouble, but cuts the grass weekly, and rolls it often, but does not approve of very close cutting. Col. Wilson's essay is practical and sensible, and commends itself to every person's judgment.

Mr. Wilder advised not to shear a lawn after frost comes, but to let the grass remain and form a covering for the winter.

Mr. Hovey advised to cease watering after the first of September.

John Fillebrown said that a gentleman in Medford had a piece of ground where the worms ate off the grass, and he put on salt at the rate of forty bushels to the acre, which caused the grass to grow so vigorously that it loooked more like rye, and, though it was on a very light knoll, he had a fine crop of hay. No manure was used besides the salt, and the worms had not been heard from since.

Mr. Hovey said that, as a rule, salt should be handled with the greatest care; he had many times been the victim of its use. He once had an azalea which had wilted, and by mistake he gave it water which had salt in it, and, though he washed it out, the plant died. In 1833 his father's grounds were overflowed by salt-water three inches in depth, and, though it remained but a short time, thousands of plants were injured, and after every rain the ground was white.

Mr. Wilder said that, under certain circumstances, salt in minute quantities may be beneficial to plants, but he had had four fine pear trees near an asparagus bed killed by salt applied to the asparagus, and we must be very careful in its use.

Col. Wilson said that, chemically, salt is a chloride of sodium, and the soil will scarcely absorb it beneficially. Chlorine, even in limited qualities, is deadly to animal and vegetable life. The only benefit of the soda is to convert nitrogen into its various forms by the various chemical reactions in the soil. Soda applied to grasses where there is organic matter in the soil is thus of great benefit. To kill worms in the soil either nitrate of soda or muriate of potash, largely diluted, may be used with great advantage.

Mr. Moore said that twenty-five or thirty years ago he used fifteen hundred bushels of salt in one year and did not want to use it again. It is not a manure in any sense of the word, and, besides killing worms, is beneficial only by attracting moisture. It is worse than

useless on asparagus, and Joseph H. Fenno had pear trees killed by the tide flowing in on them. Salt must be used very carefully, if used at all.

Notice was given that on the next Saturday the subject for discussion would be "Peaches and Plums; their Cultivation and Varieties, and the Treatment of their Diseases," to be opened by John B. Moore.

BUSINESS MEETING.

SATURDAY, February 9, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

The President, as Chairman of the Executive Committee, to which was referred a letter from Peter Henderson, proposing to give certain prizes, to be awarded by the Society, reported that it was not deemed advisible by the Committee to accept the proposition made by Mr. Henderson, it not having been the general policy of the Society to offer such prizes. The report was accepted.

The Annual Report of the Treasurer was read by the Secretary, accepted, and ordered to be placed on file.

The Secretary read a letter from Arnold A. Rand, expressing his appreciation of and thanks for the resolutions passed by the Society in memory of his father, Edward S. Rand.

Adjourned to Saturday, February 16.

MEETING FOR DISCUSSION.

PEACHES AND PLUMS; THEIR CULTIVATION AND VARIETIES AND THE TREATMENT OF THEIR DISEASES.

John B. Moore had been appointed to lead the discussion, and said that the peach was introduced from Persia, which corresponds in latitude to the Southern States of the Union, and thus, being a native of a warmer climate than ours, is hardly at home in the climate of New England, unless by a long course of acclimation it has become suited to the conditions in which it is here placed. It

is one of the finest fruits, and we all desire to grow it, and the question is how we shall do it. The first thing to do is to select a suitable location, and the best will be found on high ground, at least partially protected from cold winds, and with a warm, rather light soil, where the wood will finish its growth and ripen early. Ripe wood implies well matured fruit buds. But even in the best location, no grower expects a crop more than two or three times in five years in orchard culture. With moderate growth the tree will be more permanent and better able to withstand the winters than with a too vigorous growth. The speaker had seen quite a number of times, on a hill slope, the line of winter killing of fruit buds so plainly marked that twenty feet below a certain line the buds were all killed, and twenty feet above they were all good, showing the benefit of high ground.

A proper site being selected, the next point is the preparation of the soil. If the land is in condition to produce thirty or forty bushels of corn to the acre it is rich enough. If it is rich enough for pear trees it will be too rich for peaches. He would apply no stable manure except when a crop of fruit is set; then manure may be applied with impunity to carry it out. Trees of one year's growth from the bud are the best to plant. Natural trees are not more hardy than budded. The best trees are those grown four or five feet high the first year, with sufficient distance between them, giving plenty of room and air, so that they will be well branched and stocky. When planted every side limb should be cut off; they will die if they are not cut off. They should be planted as carefully as any other tree, from sixteen to eighteen feet apart. It has been the custom to plant closer; but then there is no room to cultivate with a horse, and it is inconvenient getting out the fruit. The dense shade spoils or deteriorates the fruit on the lower part of the tree, and no good fruit is produced except at the tops of the trees. Plenty of sun and air give better colored and flavored fruit, and one bushel of good fruit is worth two of poor. The fruit is more easily handled, and there is no excuse for crowding where land is as cheap as it is here. Mr. Moore said he liked to see a peach tree in good shape; he does not believe in allowing them to branch down to the ground. They will split down just as easily as if branched higher, and, after trimming off all the side branches at the time of planting, so that only a bare rod is left, he heads down to a uniform height of four feet by measure, which is easier than to do it by guess. The vigorous shoots will

come from the upper part, and will often make a growth of two feet in length the first year. The weak shoots starting less than eight inches below the top should be cut off during the summer, but only gradually, for the tree must have leaves to enable it to make roots. The land must not be allowed to run to weeds or grass, but should be cultivated in some hoed crop that will not exhaust the soil. Do not crowd a potato hill or anything else too close to the young trees, but be satisfied if the crop pays the expense of cultivation and keeps the soil mellow and in good condition to absorb the rain.

The next spring after planting, cut out all the branches but four or five of the best, and, in pruning to give shape, shorten these about two-thirds, always cutting to an outside bud, which will make a lower and more spreading tree. Never shorten the small branches, but only the leading ones. A year afterwards pursue the same course. This will make the trunk larger, and the limbs larger where they join it than they would otherwise be; and, the limbs being shorter, the weight of the fruit will exert less leverage, and they will hang nearly to the ground without needing a prop, which is liable to work out, to keep them from breaking.

The fruit must be thinned when the crop is set. The speaker never saw a workman with sufficient courage to thin peaches sufficiently. He has showed his men just what to do, but they fail to do it. A good rule is to pick off as many as you think ought to be thinned out, and then to take off half the remainder, and never leave two together. The proper time to thin is when the fruit is stoning, and is about as large as a walnut. It must be done before the stone is hardened. The exhaustion of the tree is from the formation of seed, not of pulp, and consequently a small fruit will exhaust it as much as a large one. It is a good deal of work to thin the fruit properly, but you will get as many bushels; and one bushel of fruit thinned is worth three not thinned; and, if the trees are pruned as directed, half the work can be done while standing on the ground.

Stable manure should not be used; bone and wood ashes are undoubtedly the best fertilizers. The experiments of Professors Goessmann and Penhallow are of considerable importance, apparently showing that trees once diseased with the yellows have been restored to health by the application of muriate of potash; but the speaker had not succeeded in doing this.

Muriate of potash is undoubtedly valuable as a fertilizer, and he

would use it on a young orchard. The yellows is the worst drawback on the cultivation of the peach. The peach borer which works just under the bark, can be kept down without much trouble by cutting out, or by putting a little mound of lime or ashes around the trunk of the tree. Nursery stock is often infested with borers, and in buying trees it would be well to reject such. No other insect troubles the peach.

In regard to varieties there is nothing new that is particularly desirable. For market there is nothing better than Crawford's Early. The Foster is a seedling from it, perhaps a little rounder and higher colored. Crawford's Late is sometimes touched by the frost before it ripens. The Oldmixon Freestone is a strong grower and productive, but in quality is not quite as good as Crawford's Early (though on this point tastes may differ), and does not sell as well. Mr. Moore advised to plant for market mainly Crawford's Early with a few Crawford's Late.

In the cultivation of plums the worst difficulties are the curculio and the black knot. Some years ago the latter destroyed most of the plum trees in this State, but of late the speaker had found no difficulty in keeping ahead of it; indeed on his trees it had grown less every year. Professor Farlow says it is caused by a fungus, and that one reason why cutting it off did not check it is that the pieces cut off were dropped on the ground, and the vitality of the spores was not destroyed by the winter. They should be picked up and burnt immediately. The curculio has not troubled the speaker because his trees, of which there are about twenty-five, are planted in a hen-yard, where the insects become food for the hens. They thin out the fruit a little, but not enough to injure the crop. These trees have been planted five or six years, and some of them have borne more than a bushel of fruit each.

The best soil for plums is a strong loam; the curculio is not so troublesome there as in lighter soils. Plum trees thrive particularly well in the vicinity of Ipswich, and seem almost as hardy as apple trees. Many varieties have a tendency to make long, sappy shoots, which should be shortened so as to cause the tree to spread laterally instead of running up. The small branches should not be pruned off, as the fruit buds are formed on them. An excessive crop must be thinned. The present generation hardly knows what a good plum is, and only wants plums to can or preserve. Those who remember when the finest plums were produced in abundance are few in number, and it takes a good while to educate the public taste.

The Bavay's Green Gage is fine for table or market; it ripens very late. The Bradshaw is large and showy, but not of the highest quality. Coe's Golden Drop is productive, and one of the very best; it is very late and hangs on well. The Green Gage is of the highest quality. The Imperial Gage is almost as good in quality and a better grower. The Jefferson and Lawrence are among the best. Pond's Seedling is of splendid appearance, but the quality is not very good. Prince's Yellow Gage is of the best quality. Smith's Orleans and Washington are large and fine, but the latter is inclined to rot. The market is not discriminating as to quality, large, showy varieties selling best, nearly all those purchased being used for preserves. As market fruits, and for canning, the Lombard and Damsons will bring as much money as any.

E. W. Wood was next called on, and said that the two fruits under discussion, when well grown, afford as much satisfaction as any; but some years ago they became more difficult to grow than they had been before, and people were discouraged, and the trees, especially the plum, became almost extinct. The Green Gage is the standard of quality in plums, but the tree is a poor grower. Most people buy fruit by the eye, and the Green Gage does not show like the Bradshaw.

The great obstacle to the cultivation of peaches here is the yellows. It cannot be that the soil is worn out, for there is plenty of new land. The speaker went to Worcester when a boy, and in D. Waldo Lincoln's nursery, on a sidehill, saw a line on the lower side of which there was no fruit, while those above the line had a full crop. It must be remembered that we are not in the most favorable location for the culture of this most delicious fruit. If Dr. Goessmann's experiments are successful it will be one of the best results of the Agricultural College. The Hale Brothers, of South Glastonbury, Conn., thought, from an experience of several years, that if sufficient lime was used around peach trees it would prevent the yellows; but Dr. Goessmann found more lime around diseased trees than elsewhere. Others have thought they had found a panacea for the disease, and then their trees have been overcome by it. A peach orchard was entered for the prize offered by this Society, which the owner thought perfectly healthy, though there was yellows in an old nursery not fifty rods away; but before the crop was gathered the yellows appeared, and the orchard is now virtually destroyed. The disease was in the trees in the nursery, and probably in the seed planted, and the question is, where a

more healthy stock can be found. The stones should be carefully selected from the healthiest trees, and not picked up indiscriminately in the market and elsewhere. Budded trees have died in three or four years, while natural trees of late varieties known as "frost peaches," have remained healthy in fruit and foliage for twenty years.

Charles M. Hovey said that his experience in the cultivation of the peach and plum was confined to a limited number of trees. His views in relation to the yellows and black knot were at variance with those generally entertained, and he had not heard of any experiments to convince him of their incorrectness. He agreed with Mr. Moore in regard to the cultivation of peaches, but does not like low limbs on any kind of tree. On high land, with a dry bottom, the wood will mature and the trees will go through the winter more safely than on low, moist land. Mr. Moore is correct in regard to the use of stable manure for peach trees, but it will do no harm if too much is not used. The peach bears only on the young wood, and must be pruned back. A peach tree in his father's garden, planted in 1815 or 1816, was twenty feet high in 1830, and free from the yellows. In New Jersey and Delaware the cultivators of peaches do not pretend to grow trees over five or six years, and, under these circumstances, it is useless to spend a great deal of time in pruning. He advised to plant frequently, so as to keep up a succession of trees. The yellows does not appear until the trees have borne two or three heavy crops of fruit. In houses trees fifteen or twenty years old never have the yellows, which would appear as if the disease was caused by climatic influences. As far south as Georgia there are occasional cold winters when Tea roses and raspberries get injured from the effects of the cold, and produce few flowers or fruits. The speaker did not think the yellows a contagious disease. It might be that peach trees injured by the winter, if cut down and fertilized with potash, would recover. The peach is undoubtedly one of the most valuable fruits. Many years ago, the speaker had a collection of seventy varieties, planted six feet apart in one row, for the purpose of testing them. Many proved synonymous with others. All grew and bore so abundantly that the ground was covered with the fruit, and he picked six or seven bushels, but got only a dollar per bushel. At about the same time he planted thirty rows of peach pits, which were budded, and, after the salable trees were taken out, some of the crooked trees and seedlings produced delicious fruit, among

the latter being the White Ball and Cambridge Belle. Scarcely any of them died of yellows.

Mr. Hovey's father had twenty plum trees in his garden, some of which bore as much as five bushels each. The last time they bore such a crop was in 1827 or 1828; then the fruit began to drop, and afterwards the black knot came, and increased so as to destroy the trees about 1835 or 1836. Later the speaker planted fifty specimen trees of as many varieties, which, after bearing one or two crops, became completely covered with black knots, which soon destroyed them, and he had no plum trees left except nursery trees. This disease is unknown in England, and both it and the curculio are rarely seen under glass. In regard to varieties the speaker agreed very nearly with Mr. Moore, but added the McLaughlin as one of the finest varieties. The Lombard takes the eye, and is one of the most profitable kinds.

Joseph Clark had been successful in the cultivation of plums, keeping away the curculio by the use of thin whitewash, the lime being slacked twenty-four hours before using, and applied with a garden engine or hand syringe twice a week, from the 1st to the 20th of June. After that time the insects will not cause the fruit to drop, and the punctures will heal. The insects will not come near the whitewash, and it will all disappear before the fruit is ripe. Jarring down the curculio is successful only when done early in the morning. The black wart was the greatest difficulty he had to contend with; he cut them off, and put them on the brush-heap, where they were burned with other refuse, but they destroyed his trees in nine or ten years, and he advised to plant a succession of trees, — a few every six or seven years. He thought the Imperial Gage the finest kind. The General Hand is very productive, but only of second quality. The Bavay's Green Gage is a larger fruit and more productive than the old Green Gage.

George Hill thought that the ground had been thoroughly covered in discussing peach culture, except in regard to the yellows, and there all theories had failed. The only way to avoid this disease is to plant often, in the hope that some trees will escape. If the trees treated by Professor Goessmann really had the yellows the muriate of potash must be a remedy. The speaker knew no peach trees ten years old except isolated ones.

Hon. Marshall P. Wilder was called on, and said the subject had been so well treated that there was very little for him to add. The object of these meetings is to collect information which is

absolutely correct, and he believed that they had to a great degree effected this object. When he plants peach trees he heads them down to two feet instead of four, as practised by Mr. Moore. They will then make a tree five feet high in one year in a fair soil. There is a great gain — at least a month — by the introduction, within a few years, of many very early new varieties, of most excellent quality, some of which are sent to our market from Georgia as early as the first of June. The speaker had great faith in Professor Goessmann's experiments with muriate of potash; but, when trees can be raised so quickly and easily, he would take out diseased ones and plant anew.

Some locations are very favorable to the plum. Samuel Pond and Henry Vandine.were very successful in their culture in Cambridgeport. If planted on a large scale jarring the trees is the best method of destroying the curculio, and is a certain prevention. Ellwanger & Barry, of Rochester, N.Y., have a plum orchard of an acre or more, and from the time of blooming until the 20th of June it is the whole business of one man to attend to them, jarring — not shaking — down the curculios on a sheet, from which they are gathered up and destroyed. If planted in the hen-yard there will be no trouble from curculios. He believed the black knot to be caused by a fungus, and advised to begin when the trees are young, and cut it out before the spores mature.

Benjamin G. Smith had kept away the curculio with whale-oil soap, one pound to five gallons of water, applied every other day with a garden engine. It seems to be offensive to the insects and makes the foliage brighter.

Notice was given that on the next Saturday, Col. Henry W. Wilson would read a paper on "The Practice and Value of Irrigation to our Farmers and Horticulturists."

BUSINESS MEETING.

SATURDAY, February 16, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

No business being brought before the meeting, it adjourned to Saturday, February 23.

MEETING FOR DISCUSSION.

THE PRACTICE AND VALUE OF IRRIGATION TO OUR FARMERS AND HORTICULTURISTS.

By COL. HENRY W. WILSON, Boston.

Few cultivators have experienced the effects of a protracted drouth without feeling that it must be a very pleasant thing to have a sufficient supply of water at command, with which to revive the withered grass and corn or to restore the shrivelling vegetables and small fruits.

If they ever applied their thoughts to the problem how this might be accomplished, the exigency would probably have passed before they realized a clear conception of a beneficial scheme, and, during a succession of favorable seasons, the desire would either fade away entirely, or be postponed until a more convenient season, as is too often the case with matters that require sustained effort, by the average New England farmer.

The purpose of this paper is to show that the science and practice of irrigation have been appreciated in all ages of the world, in countries having every variety of climate, and among peoples of every degree of civilization; while in the execution of the various works rendered necessary for the development of some of the vast projects whose remains are strewn up and down over the surface of the earth, an amount of wealth, skill and labor has been expended which startles the beholder and fills him with amazement.

An attempt will also be made to show, by a brief statement of what cultivators are now doing in this as well as other countries, that an adequate supply of water is at the command of most cultivators, at so little expense for original outlay and maintenance as to be within the means of any resolute or thrifty man, and to

be easily reimbursed by the preservation of a single crop from the effects of a severe drouth.

The practice of irrigation is but little understood except by those who are obliged, by the necessities of the seasons, to follow it continuously from year to year, as the condition of success with any and all of their crops.

It is to be hoped that the time is not far distant when all our farmers and horticulturists will learn that, where favorable conditions exist, the cheapest and wisest thing they can do is to make all necessary arrangements for complete irrigation, as a safe resource in those years when the meteorological conditions of the seasons are disturbed by an irregular distribution of the annual supply of moisture.

Irrigation is an old art, which experience quickly taught the ancient world to be a thing not merely of utility but of prime necessity. Probably the first engineering works executed by man were in connection with some scheme for irrigation.

The first definite record which we have of any such project is that of the construction of the pools of Bethlehem, at Etam, by Solomon, even now called by the natives the Pools of Solomon. The aqueduct which was subsequently rebuilt by Herod, leads the waters of these fountains through a ten-inch earthen pipe to the gardens on the eastern slope of Mount Zion to this day.

These reservoirs are three in number, built of substantial masonry and lined with cement; they are constructed in a narrow valley, one a little higher up than another, and contain respectively 38,000,000 gallons, 24,000,000 gallons, and 16,000,000 gallons, thus having an aggregate capacity of 78,000,000 gallons, or somewhat less than three-fourths of the capacity of the Brookline reservoir of the Boston water works.

The perfect and solid construction of these basins, the use of hollow stone pipes, some of which have been exhumed in recent years, and the thorough understanding of relative levels, as well as a multitude of engineering devices, all indicate that the workmen who planned and executed these works, which, for that time, were of considerable magnitude and are of respectable size, even when compared with similar modern works, must have had a most excellent knowledge of the principles of hydraulic science, to which not many additions have been made by engineers in later days.

That they were intended as works purely for irrigation, we have

Solomon's own language, in his glowing description of the great works which distinguished his reign: "I made me great works; I builded me houses; I planted me vineyards; I made me gardens and orchards, and I planted trees in them of all kind of fruits; I made me pools of water, to water therewith the wood that bringeth forth trees." — *Eccl. 2: 4–6.*

Besides, we remark that the level of the aqueduct was too low to afford a supply for domestic purposes; this was provided by the pools of Gihon, on the west side of Jerusalem.

All through Mesopotamia, and particularly in the country about the sites of ancient Assyria, Nineveh and Babylon, the land is intersected by the extensive remains of irrigating canals and works which were built, in the days of their glory and prosperity, to distribute the waters of the Tigris and Euphrates among the gardens and plantations of those opulent cities, and were doubtless a great part of as well as the source of their wealth; some of the embankments of these old canals are hundreds of miles in length.

These were all grand public works. Private methods of irrigation were upon a more modest scale, often supplementary to these, and may now be seen in active operation in Egypt as well as Palestine.

In some cases the source of supply is an ordinary well, sunk with much labor, in the hard limestone rock; in others, a small stream, or it may be the branch of a large canal. Often the means used for elevation is the simple balanced sweep, so well known through New England a generation or two ago, and which is probably the most ancient of all contrivances for elevating water; combinations on this principle are still in use upon the Nile.

Egyptian paintings and sculptures represent men carrying water in buckets or skins, strung at each end of a pole borne upon the shoulder, precisely in the same manner as the Chinese carry burdens to-day, and as men can be seen carrying water to water the soil in Egypt.

Large and ill-constructed wheels seventy and even ninety feet in diameter, driven by mules or oxen, labor day and night, saddening the air with their laborious groanings as they strain and creak with their burden; over these wheels are passed two lines of ropes, made of withes twisted together, upon which are secured either wooden buckets or earthen jars, as the wealth or poverty of the husbandman compelled him to construct his machine; the buckets or jars passing up full from the fountain are discharged at the top

and descend empty, as in the ordinary chain-and-bucket pump. These contrivances are of comparatively modern invention.

The Chinese have a method of constructing a pump which is ancient with them, but is exceedingly simple, and not susceptible of much improvement in certain cases.

It is to pass a long, continuous canvas belt over a driving wheel; on the outside of the belt are fastened wooden blocks, at intervals, which, by the motion of the wheel, are drawn up through an inclined trough, the lower end of which is placed in the water and the upper end at the point of discharge. As the wheel revolves it draws the belt, and the water is carried up in the trough by the blocks. When properly constructed this is a very efficient pumping machine, and is much used in river work by the engineers and miners of the Pacific coast, being called, from its origin, the China pump.

The water, having been elevated, was at the command of the husbandman and diverted at his pleasure. To this, allusion is made in Prov. 21: 1 — "The king's heart is in the hand of the Lord, as the rivers of water; he turneth it whithersoever he will."

There is another significant allusion to the method of irrigation in Deut. 11: 10 — "The land, whither thou goest in to possess it, is not as the land of Egypt, from whence ye came out, where thou sowedst thy seed, and wateredst it with thy foot, as a garden of herbs." This is thought by some commentators to refer to a very general practice in use among Oriental nations of driving those elevating wheels by men, as in a treadmill; but it is by no means certain that such machines were in use in the time of Moses, and the probability is that it refers to the practice of the cultivator in distributing the water upon the land by opening and closing the smaller water-passages with the foot.

In any event, it is clearly apparent that at the earliest dawn of history, both in theory and practice, irrigation was understood and carried out pretty much as it is to-day.

The pools of Samaria, Gihon, Hebron, Siloam, and Bethesda were all of them artificial basins or conduits for the storage or distribution of waters, to relieve either an occasional scarcity or a permanent need.

In Egypt the annual inundation of the Nile has always, from the rainless character of the country, been the condition of the fruitfulness of the soil, as the bulk of the arable land is in the valley of the Nile, and the extent of the rise of its waters has been the

measure of the abundance of the harvest. This rise usually lasts for about two months, in the summer. The extent of the valley is not so great as is generally supposed,; for the most part it is only a strip of country of from five to seven miles in width, including the river, and comprises, with the Delta, only 4,500 square miles or 2,880,000 acres, — a little more than one-half the area of the State of Massachusetts. There is good authority for believing that the inundations of the Nile have increased since the times of the Pharaohs.

The River Nile, as is the case with all sediment-bearing rivers, runs upon the highest ground, the land sloping back on either hand from the river, so that, when the river overflows its banks, all that is necessary to be done is to restrain it by levees and conduct the water, by canals and ditches, over the whole surface of the country. Of course, if the river ran only bank-full, not rising above the height of the banks, all of the irrigating water would have to be pumped into the canals with infinite cost and labor and, as the amount thus obtained would necessarily be limited, scarcity or famine would be inevitable.

Lake Mœris has been from the earliest times a very important part of the irrigating system of the Nile valley. The early travellers who visited that country, to be filled with wonder at every remarkable thing which they saw, yielded too much to their credulity, and reported this lake as an artificial reservoir, excavated by the manual labor of thousands of captives taken in war. This account has passed unchallenged for generations, and has been reproduced in most of our text and reference books, until some practical fellow, who had no veneration for traditions or delusions because they were old, showed very clearly that this lake is a natural basin, beyond a doubt. It is about thirty miles long and seven miles wide, and is connected with the Nile by a canal, which is unquestionably artificial, and called Joseph's Canal, but not after the Joseph of Genesis. The natural level of the lake is such that the waters of the Nile would flow into it in times of inundation, and enormous quantities could thus be stored and afterwards utilized, upon the receding of the river, in prolonging the period of natural flow of the irrigation canals. The slopes of the shore which were thus alternately flooded and drained, were of great fertility, and were cultivated to the very margin of the receding waters.

In Palestine, as now in Italy, France, Germany and a large part of the Pacific coast of the United States, the winter rains sufficiently moistened the earth to assure the husbandman of one

crop, and the watering of the soil by artificial means permitted the growth of two and sometimes three crops, which could not otherwise have been obtained. Well did the sacred writers allude to the hills of Judea as dropping fatness, and the land as flowing with milk and honey. We may realize how, by this means, a land so limited in area could provide a home and a support for the vast population which dwelt there, and, furthermore, create such accumulations of wealth as furnished spoil for the successive generations of plunderers, who swarmed over the land alternately from the east and the west. Truly it was a beautiful land, and well-named Canaan.

In Italy it is estimated that the irrigating canals, with their principal branches, exceed 4,500 miles in length, conveying more than 24,000 cubic feet of water per second and irrigating over 1,600,000 acres. The original cost of these works would represent more than $200,000,000, which has been extended over a period of more than 700 years. They are chiefly owned by the government.

In Spain, the area of irrigated land is 4,439 square miles, or 2,840,000 acres which is almost precisely the whole amount of land in the valley of the Nile. Of this area no more than 500,000 acres are irrigated by the great canals or irrigation works. For the most part the water is elevated so as to flow upon the land by means of wheels, having either jars or buckets upon their peripheries, and actuated either by the current of the river or by animal power, as in Oriental countries.

A dam constructed in the province of Alicante, in Spain, for the storage of waters for the irrigation of vineyards, is remarkable as being the highest embankment ever constructed for similar purposes. It closes a steep gorge between two mountains, and is 156½ feet high, 272½ feet long, and 69½ feet wide on top. The aqueduct for withdrawing the water is excavated through one of the mountains so that it might be cut through the solid rock and avoid the weakening of the dam, which always occurs when the outlet conduits are carried through the dam itself.

The Moors introduced irrigation into Spain nearly one thousand years ago, and the system of management, care, and administration established by them has been retained in all of their essential features to this day.

Taxes for the use of the water are levied generally in proportion to the area cultivated, in some cases in proportion to the quantity of water used.

The officials who manage these works are elected by vote of the proprietors of the lands, for stated times; generally for three years. They must be actual cultivators of the soil; they distribute the water, in time of scarcity, to those who need it most. If the whole crop cannot be saved, by reason of a deficiency of the supply of water, one-half of the field is irrigated and the other half is left to suffer. Hemp, being the most valuable crop, is first attended to; the next crop in estimation by long custom is the artichoke.

The decision of the official is final, and the person who takes water from the canal surreptitiously is liable to severe punishment.

The ancient Peruvians covered the lowlands of their country with an immense net-work of costly canals for irrigation, which were in use when the Spaniards overran that country. The canal which chiefly watered these sandy and sterile plains, conducted the waters from the heart of the Andes, hundreds of miles away, over arches spanning frightful chasms, and through tunnels which were bored through the living rock without any tool either of iron or steel. The enormous slabs of stone which formed the conduit are fitted together without cement, and the whole work is so stupendous and scientifically constructed that engineers of skill and experience have admitted that it far excelled anything they had ever seen or read of.

The irrigation works of India are extensive beyond the most extravagant flights of the imagination. Every river, including its branches, seems to have been made the object of laborious solicitude for the storage of its surplus waters. Every drainage basin in the hill country has been made the site of a tank. This term gives us the idea of an ordinary cistern which is commonly so denominated. But when we come to appreciate that an East Indian tank is a huge reservoir or storage-basin, sometimes ninety to one hundred feet deep, with enormous embankment dams, and retaining thousands of millions of gallons of water, — that it often becomes the lair of the crocodile, from which it is almost impossible to dislodge him, we are prepared to form a very different opinion of the size of a tank.

To give some idea of the capacity of these basins I will enumerate a few.

The Ponairy tank, at Trichinopoly, has an embankment of 30 miles in length, and a storage area of 70 square miles.

The Veerannum tank has an embankment of 12 miles in length and a storage area of 30 square miles.

Most of these reservoirs were made by the natives so long ago

that all records or traditions of their builders or construction are forgotten; and yet, in fourteen districts of the Madras presidency alone, the English engineer officers have enumerated 53,000 of these tanks having 30,000 miles of embankment and 300,000 subsidiary works, constructed of masonry. A map of this section of the country reminds one of a frond of the adiantum, so frequent and uniform are these tanks in distribution and appearance.

Perhaps the most remarkable one of all is the Mudduk Masoor, on the River Choardy, built about four hundred years ago, although now broken from defective construction. Its dam was 1,650 feet long, with side slopes 2½ and 3 to 1; maximum height of dam, 108 feet, made solely of red earth and gravel; breadth of dam at the broadest part of the base, 1,100 feet; depth of water in the tank, 90 to 95 feet; drainage area, about 500 square miles, or nearly seven times the entire drainage area of the water works of Boston.

The storage area of this tank was 40 square miles,— equal to the whole water-shed of the Sudbury river, —and its storage capacity was 1,400,000 cubic yards, or 37,800,000,000 cubic feet, or 283,500,000,000 gallons, which is equal to the capacity of two hundred and fifty of the largest basins of the Sudbury river, or three hundred and thirty-eight times the capacity of Chestnut Hill reservoir, and would afford a constant daily supply for one year of nine times the utmost capacity of the Sudbury river conduit.

India is largely intersected with lines of canals, many of them constructed of sufficient size to be used for transportation as well as for irrigation.

One of these, the Ganges canal, is 900 miles long, 170 feet wide, and 10 feet deep; it carries 7,000 cubic feet per second, equivalent to 245,000 miners' inches of 17,000 gallons per day; irrigates 1,500,000 acres, and cost to build $12,000,000,— which sum, contrasting the value of labor and material, is fully equal to $100,000,000 in the United States. Almost all of the irrigation works of India are in the hands of the government.

In those countries where the annual precipitation of moisture is confined to the few months of winter, and the dry season is protracted through six or seven months, during which, practically, no rain falls, all herbage dries completely up during the summer months. The line or rather plane of saturation in the soil lies at so great a distance from the surface that the roots of shrubs, trees, and vines penetrate to a greater depth, and are thereby better enabled to resist protracted drouth, than in those districts where

the rains commonly fall at intervals throughout the year, as with us.

Take for example the State of California, in the valleys of the Sacramento and San Joaquin; there the annual rainfall rarely exceeds twenty inches, and is sometimes as low as five inches; but twelve or fifteen inches will insure a bountiful harvest if it falls during the later winter or early spring months, and the earth, having absorbed it, is enabled in the spring-time to nourish the crop, and to ripen it, before the dry season has fairly set in. The harvest begins at about the middle of June, and often lasts until the first of November, during which time the harvested crop, whether it be hay or grain, may be left in the field for any length of time, in the perfect assurance that no harm can come to it from either rain or dew.

Where the soil has not been exhausted by continued culture without the use of fertilizers, as soon as the crop is harvested another can be started at once by the use of irrigation, moisture being the only thing wanting in the steady heats of summer to stimulate the most luxuriant growth.

Without irrigation one crop a year may be secured with no apprehension of failure, except in the San Joaquin valley where not more than two good harvests can be expected in five years, but with irrigation two and often three full crops are to be obtained with positive certainty.

In the valley of the Humboldt which was drained, but not watered, by the Humboldt river, until its entire flow was diverted for the purpose of irrigation, lands which, five years ago, the writer saw covered with nothing but the wild sage-brush (*Artemisia sempervirens*), and to all appearance as barren, for tillage purposes, as the malls on our common which, by the way, they much resemble in color and texture, — those lands are today yielding bountifully of wheat and alfalfa, the latter with four crops per year, at an average of four tons of dried hay, at each crop, per acre. The presence of the wild sage is the best indication of the adaptability of the soil to the cultivation of wheat with irrigation.

In Utah there are only about 1,447,000 acres of land adapted for irrigation, about 325,000 of which are now under cultivation. The supply of water is quite limited, as the annual precipitation of moisture is only about one-sixth of that in the New England States, while the evaporation is double. There can be no successful cultivation in Utah without irrigation.

All through the hill country of California every rancher who can by any means obtain a connection with one of the various mining ditches, with which the country is intersected, begins, as soon as his hay crop is secured, to turn on the water and give his fields a thorough saturation: vegetation is stimulated to a new growth, secured at a small expense.

Many of these ditches which were constructed at enormous cost in the heyday of placer mining, now that the placers are all worked out, constitute a perennial source of increase and wealth to the husbandman, who has succeeded to the miner and come to stay.

One of these ditches, called the Bear River Ditch, is 70 miles in length, and cost $2,500,000 to build, in the year 1851; it carries about 3,000 miners' inches of water, or about 45 cubic feet per second. It was constructed to bring the water of the Bear river down to the rich placer mines of Placer county, and was used for mining exclusively, but not now at all. Running, as it does, through the fertile foot-hills of that county, it is a permanent guarantee of fruitfulness to the vineyards and farms which are being planted at either hand, on lands which lie below the level of the ditch. The number of canals and ditches used for irrigation in California is 225, having a total length of 1,000 miles and irrigating, in 1880, 292,885 acres.

With the positive assurance of sunshine and water the cultivators of those fruitful lands can flatter themselves with the certainty of success, as far as that success depends upon warmth and moisture; but our farmers and horticulturists, to whom both sunshine and storm are often uncertain or stinted, may truly be said to plant with no assurance of a watering by the early or later rains, or that the increase will come in due season.

Concerning the cause of the constant recurrence and frequency of drouths it is of but little use to speculate, as we deal more with facts than philosophy; it is plainly more for the interest of the cultivator, whether he own one acre or many, to cast about him and ascertain whether the conditions do not exist which will enable him, if he avail himself of them, to be independent of the rainfall and sure of his crop in any season.

In Southern California much attention has been given to irrigation within the past few years. Formerly the chief attempts by the native Californians were in the vicinity of the large springs, which are a striking peculiarity of that country, and are called "cienegas." In the vicinity of Los Angeles and San Bernardino,

these springs furnish, in the aggregate, perhaps from 55 to 60 feet of water per second and irrigate about 6,622 acres; each, according to its size, irrigating from 20 to 400 acres.

That section of the State being a true artesian basin, recourse has been had with much success to the artesian wells, which have been sunk in considerable numbers, and depths varying from 50 to 550 feet; and, while many wells have failed to strike water, most of them are flowing wells, having sufficient pressure to deliver water 10, and even in some cases 20, feet above the surface of the ground.

By an estimate made in the office of the State Engineer of California in 1880, there were about 550 flowing wells in the coast valleys of Los Angeles, and additional ones were constantly being put down.

These wells are mainly in three principal districts or groups: one in the neighborhood of Compton, and bordering on the River Los Angeles, another in the vicinity of Artesia, near the San Gabriel, and the third in the settlement of Westminster, near the Santa Aña river.

The greatest discharge observed at any well was 1.7 cubic feet per second. A common amount was 0.2 to 0.3 cubic feet, while the average was no more than 0.1 cubic ft. per second, or 6 cubic feet per minute, equal to 4 miners' inches or 68,000 gallons in twenty-four hours, which, in New England, we should esteem as a goodly stream to flow from the end of a pipe two feet above the surface of the ground.

In the county of San Bernardino there were quite four hundred more wells, but, as the pipes were mostly two inches in diameter, the total estimated discharge was no more than 20 cubic feet per second. These wells flow steadily in a stream from one to three inches in depth over the rim of the pipe, the water falling beautifully in an unbroken sheet or dome until it strikes the ground.

The total cost of the successful wells in Los Angeles county alone was estimated at $220,000 or about $400 to each well, and, estimating the aggregate flow at 55 cubic feet of water per second, would bring the cost of the water to $4,000 per cubic foot per second, which may seem at first to be a pretty high price, without making any account of the numerous failures in sinking unsuccessful wells.

When we consider however that, at an average cost of $400, a constant supply of pure water is obtained directly in the midst of a farm, from sources which will deliver 68,000 gallons of water in

twenty-four hours, at a height two feet above the surface, that, if money is worth ten per cent per annum on good security, the annual cost of the well is $40, and that it is a system needing no repairs, securing the certain irrigation of 30 acres which could not otherwise be kept in profitable cultivation, the annual water rental of $1.33 per acre for such results appears very moderate indeed; being, moreover, less than one-half the price that is commonly paid in irrigating countries, and within a few cents of the average cost of water from the best canals of India, where water is the cheapest in the world.

More water is derived from these wells than the owners are prepared to use; it was in the beginning allowed to run to waste, and to form pools of stagnant water, very injurious to health and of no benefit to the soil. By a law passed in 1874, owners of artesian wells are required to check the flow of their wells when the water is not needed for use.

A striking peculiarity of these wells is their uniform temperature. Four wells near Pomona showed an unvarying temperature of 67° for the entire year; while of all the wells in Los Angeles and San Bernardino counties the temperature, as far as observed, was uniformly 62°. Seven wells on Kern Island have a uniform temperature of 71° both summer and winter.

These wells cost, on an average, about $2,500 each, but could be sunk now for $1,600 apiece. They yield from 50,000 to 125,000 gallons each in twenty-four hours.

The irrigating canals of Southern California aggregate about 439 miles in length, carrying about 495 cubic feet per second, and irrigating 57,853 acres in 1880, the total amount of water consumed in irrigation in these several methods being as follows: —

	Feet per second.	Irrigating.
Natural streams by canals,	495	57,853 acres.
Cienegas or springs,	55	6,622 "
Artesian wells,	75	18,000 "
Total	625	82,475

The Los Angeles water system furnishes about 67 cubic feet of water per second, irrigating 7,755 acres of land; but as the water is used with great prodigality by many of those who have prior right to the water, the most effective duty is not obtained, being only 112.8 acres per foot per second, at a maximum cost of $143.36

per foot, or an average annual tax of $1.28 per acre, which corresponds very closely with the most favorable rates elsewhere.

An interesting coincidence in the relation between rainfall and irrigation is shown in the receipts of the city of Los Angeles for the sale of water in the years 1877 and 1878. The rainfall for the winter of 1876–7 was only five and a half inches, consequently the season of 1877 was an unusually dry one; the rainfall for the winter of 1877–8 was 21.26 inches, and was prolonged until late in the spring. The receipts in consequence of the rainfalls were as follows: —

	1877.	1878.
January	$113 00	$400 00
February	544 75	48 76
March	1,121 00	12 99
April	1,048 75	00 00
May	1,138 50	1,045 25
June	1,387 75	1,547 50
July	1,163 75	1,611 75
August	1,016 75	1,652 75
September	594 00	792 00
October	448 25	432 75
November	176 00	230 50
December	169 25	267 00

This table plainly shows the effect of the increased rainfall during the winter of 1877 and spring of 1878; it also shows that by the month of May the effect of the natural moisture for the support of growing vegetation is substantially exhausted, while by June, the sole reliance of the cultivator is upon the water of irrigation, and by the last of August the season of general irrigation is about over.

Although an attempt was made to introduce irrigation on a large scale into Cambridgeshire, England, in the sixteenth century, yet it made no progress, as an aid to agriculture, until the commencement of the present century. During the last twenty years much attention has been directed, and with a good deal of success, to the irrigation of grass lands with sewage from cities and towns. A considerable portion of the sewage of Edinburgh has for many years been used, beneficially, upon several hundred acres of adjacent meadows. At least fifty of the most considerable interior cities and towns of England now dispose of their sewage, either wholly or in part, in this manner. One thousand two hundred acres of land

at Gennevilliers are irrigated with the sewage of Paris, and great progress is being made each year in this direction.

Water meadows formed by artificial irrigation have become quite a feature in the agriculture of England and the south of Scotland. More than fifty years ago the great value of irrigating grass lands in temperate climates was demonstrated in that country. It was tried upon a piece of four acres of hillside pasture which had never been esteemed of sufficient value to be even ploughed, and was only used as sort of a chance pasture for cattle and sheep when other pastures were used up.

This piece of carse land was, by the simple flowing of water, made so productive that five and a half tons of dried hay were cut upon it in one season. No account was kept of the amount of water that was used. All through the north of England and in Scotland the use of water is well understood as a means of restoring and increasing the value of pastures and mowing.

For this purpose the water must be constantly moving and not permitted to remain stagnant. Clear water has been observed to be as effectual and beneficial, upon the finer sorts of grasses, as water bearing sediment or sewage; in fact under some circumstances these may be positively injurious.

Pure water exerts a beneficial effect upon soil and vegetation, first, by supplying a sufficient amount of moisture to answer the constant demand of evaporation, which must be met or vegetation will wither and die. Second, by conveying and mingling such an amount of oxygen into and with the soil as could not so easily be done in any other way or manner.

Water absorbs air in definite proportions. This process may be thought to be slow, but it is rapid enough for all practical purposes.

If we take a quantity of pure water which has been freely exposed to the atmosphere and expel the air by the application of heat, we shall find that a given quantity of water absorbs about 3½ per cent. of its volume of air. On exposing the water to the atmosphere, we shall find at the expiration of twenty-four hours that it has reabsorbed the normal amount of air.

Upon examining this air carefully, we shall find that while it is composed of oxygen and nitrogen, yet they are not in the same proportions as they are in the atmosphere. Water absorbs oxygen more freely than it does nitrogen; therefore, instead of finding 80 parts of nitrogen and 20 parts of oxygen, we find only 46½ parts

of nitrogen while there are 53½ parts of oxygen; from which facts, by a little calculation, we can ascertain that the air freely absorbed by water contains 42 per cent less nitrogen and 165 per cent more oxygen than the free air of heaven.

If we take water that has been sufficiently in contact with the soil to part with its absorbed oxygen, as in the case of drainage waters from underdrained lands, we shall find that in a given quantity of water there is only about one-third as much oxygen, while the nitrogen has but slightly diminished.

The oxygen has decreased from 53½ parts to $18\frac{6}{10}$ parts, while the nitrogen has been reduced only from 46½ to $45\frac{3}{10}$; so that, instead of the air of the drainage water having nearly $2\frac{7}{10}$ times as much oxygen as the atmosphere, it has lost two-thirds of its oxygen, while its nitrogen has decreased but little.

What has become of the lost oxygen?

It has been carried by the water, where it could not have gone as air, and furnished the element required to form the nitrates and carbonic acid, thus aiding to dissolve the constituents of the soil and furnish the nutriment of plants.

How this is done forms an interesting and instructive topic of itself, and would consume too much time to be considered in this connection. It has been sufficiently shown, however, that no small function of the water of irrigation is to carry deep into the soil that chemical element of air which is the support of life and heat, viz. oxygen.

During the past thirty years, a great deal of attention has been given to the distribution of manure upon the soil, by dissolving the fertilizing elements in water and delivering it upon the land by means of pipes.

A most striking account was reported by a Mr. Barber, of Muirdrockwood, Kirkcudbrightshire, Scotland. He had twenty-seven acres of land before his house, which was of so poor a quality naturally, that it had never furnished more than a poor feed for two cows only.

Into a suitable covered tank he put the manure from forty cows and four horses, filling the tank from a small stream. With this solution he irrigated twenty-two acres; the remaining five acres he enriched in the same manner with the soil and offal from the house. By this means the twenty-seven acres were made to yield sufficient fodder for the keeping of forty-four head of stock.

An excellent opportunity was afforded upon this land to con-

trast the effects of manure when applied in the liquid or solid form.

There were several knolls hard by, of similar soil and condition, upon which it was impossible to place the liquid with the pipes, owing to their elevation above the level of the supply tank, and, as they could not be irrigated in this manner, they were enriched with solid manure, applied in the customary manner.

A comparison of results showed that the land which was irrigated with the liquid manure yielded three times as bountiful crops as the other, all the attendant circumstances being equal, such as the area and apparent quality of the land, amount and quality of manure used, etc., etc.

On the farm of P. W. Kennedy, at Myer mill, Ayrshire, manure in a liquid form, diluted with four times its weight of water and distributed through flexible pipes by steam power, enabled five times as many cattle to be fed as had previously been fed from the same land, without any increase in the amount of manure purchased for the farm or any diminution in the fertility of the soil.

Many instances of this kind might be enumerated if time and space permitted, but as they are on the border-line between irrigation and the fertilization of the soil, these may suffice for this occasion. It is a topic that may profitably be enlarged upon and developed at a suitable time.

The great fact which is of interest to us in this connection, appears conclusively from this experience of English agriculturists, that it pays even to pump water by steam power and to distribute it by iron pipes over entire farms, irrigating the surface with a hose under those conditions where it is impossible to use the ordinary methods of irrigation, such as channels, sluices or catch-water meadows. In our neighborhood, and among our own members, this practice is resorted to with profit and entire satisfaction.

The very unfavorable weather of the past few weeks has alone deterred me from making a personal examination of some of the arrangements which have been made by members of this Society, who can tell us, in their own way, how profitable they have found irrigation by these methods to be to them, in their extremity, when they have summoned both wind and steam to their assistance. In one instance, which was alluded to in a previous discussion, in a severe drouth, a steam pump was rigged and the water of Mystic river was poured for seven days and nights upon a parched field, averaging 75,000 gallons per day or a quantity

equal to three inches over the entire surface, at a cost, including all expenses, of perhaps ten cents per 1,000 gallons.

These arrangements are very complete, and the example should be followed by all who would secure the highest culture and the greatest profit with comparative immunity from drouth.

With the experience of the world, in all ages and climes, there is ample encouragement to prepare for irrigation as a means to make good the deficiency of moisture in the years when there is an inequality in the monthly distribution of the rainfall. Our cultivators should not rest easy until they have assured themselves of some source for water which will be adequate to make good all deficiencies of the rainfall, and which they can hold under perfect and undoubted control, free from any interference and, as far as possible, free from tribute to any person.

The first and most natural source to seek for such a supply is a brook. Most farms have one passing through or near to them. If its waters can be diverted, at a sufficient altitude to command the arable land, let it be done: it is the best and, therefore, the proper thing to do; in any event, the higher up the water can be taken the better, as every foot that can be saved in height will save a foot of pumping.

If the brook is high enough and runs with anything of a stream, during the dry months, no reservoir will be needed for storage, but the water can be conducted and spread upon the land when wanted.

If there is no brook at hand, there are but few places in Eastern Massachusetts where copious wells may not be sunk, which will afford an ample supply for the requirements of ordinary cultivation. Whether the supply be from wells, or from a brook of low altitude, adequate storage must be prepared.

The cheapest machine for the elevation of water is an ordinary plunger pump, driven by a windmill, — not a loose-jointed affair, with adjustable vanes, such as would drive one frantic with its perpetual rattle and clatter, but one with a permanent set to its vanes, with no loose parts to get adrift in a gale, and so contrived that a violent wind or storm will turn it immediately to one side, or, as it is termed, "throw it out of the wind," thus reducing to the smallest limits the surface exposed to the force of the storm.

When once adjusted, a good windmill need not and will not cost $5 per year for repairs of every name and nature, — which practically gives one its labor for nothing.

For irrigation on an ordinary farm or market garden, the smallest wheel, to be of real practical benefit, should be at least 14 feet in diameter, elevated about 40 to 45 feet above the ground. Such a wind-engine would cost, all set up ready for duty, about $300, exclusive of the pump, and could be safely calculated to operate, on an average, eight hours per day through the summer months in any locality. It could be depended upon with certainty to elevate 8,000 to 10,000 gallons of water in twenty-four hours to a height of 50 feet, or to draw it from a well 25 feet deep and raise it 25 feet above the surface.

The conditions which will determine the elevation and quantity to be pumped are the source from which the water is taken and the lay of the land. Of course, where the purpose is solely for irrigation, it is unnecessary to pump any higher than the highest land to be irrigated.

If more water is required than one wheel of this size will furnish, it will be found in most cases to be more desirable to increase the number than the size beyond 16 feet in diameter.

There must be ample storage provided, as the pump will yield but a small stream constantly, while, when irrigation is required, we shall want a large flow at intervals. For this purpose tanks are constructed, sometimes of fair size and of wood; but it is the more useful plan to construct them still larger and of earth.

To do this successfully requires the thoughtful attention of an experienced person, and it is wise to follow the directions of some one familiar with the construction of such work, for, otherwise, you may only invite disaster: water is by no means an easy thing to hold, and it sometimes takes its leave suddenly, when 1,000 or 1,500 tons of water will not have the most pleasant effect, if it comes booming across your arable land.

The reservoir should be calculated to have a depth of not less than 6 feet, when full, as that is the least depth that will discourage the growth of rank aquatic plants, which would speedily turn your reservoir into a morass.

No rule can be laid down for the location of such a reservoir, except, to take every advantage of the peculiar configuration of the ground, to cheapen its cost or to increase its security. Under the most unfavorable circumstances of location about 450 cubic yards of excavation and embankment will make 110,000 gallons of storage, which is fully adequate for the complete irrigation of two acres at one time, and, with a 14-feet wheel, would require eleven days to fill.

SCALE 15 FT. = 1 IN.

SKETCH FOR PROPOSED
RESERVOIR.
TO HOLD 110,000. GALLONS.

One great advantage in having as large a reservoir as possible is in affording an opportunity for the water to become as warm as the sun and air will make it. Warm water possesses a vastly more stimulating effect on vegetation than does cold water. The water in the irrigating canals of California has been observed as high as 90° to 105° in July and August. The temperature of Kern lake in August and September was 90°.

The accompanying sketch shows clearly the size, proportions and manner of adapting such a reservoir, when it is constructed upon the surface of the ground, as upon the top of a knoll or hill.

The cost of such a work, if paid for outright, ought not to exceed $100 in ordinary earth; but as it represents not more than 50 days' labor of one man, it could easily be constructed, at odd jobs, by the laborers ordinarily employed upon the place. No materials need be required except good gravel and clay, or common hard-pan which makes a perfect hydraulic enbankment. It is needless to use cement or other expensive materials.

The location of the reservoir should be such that the last drop can be drawn out and usefully employed.

Since writing the above I find the statement that James Vick, the eminent horticulturist of Rochester, N.Y., in the years from 1875 to 1879 inclusive, irrigated his nurseries, consisting of 15 acres of land, besides supplying all the water for five large green-houses, dwelling-house and stable. This he accomplished with a windmill 16 feet in diameter, and the power furnished by it was adequate to pump fully twice the water if it had been required. The actual amount of water was not given by Mr. Vick; but the head was 25 feet. This is about as complete a statement of actual results as I have found in print.

A good 16-feet windmill is estimated to furnish about 3 horse-power, when driven by the ordinary summer breezes. It will average 8 hours' pumping throughout the season, although at times it will run for the whole 24 hours, and at other times it will stand still for a week. It will cost, with tower and pump complete, in the neighborhood of $400 to $450. It should pump, on the average, 15,000 gallons per day, and in 7 days would fill the reservoir, before proposed, of 110,000 gallons' capacity; during 5 months, it would or should pump 2,250,000 gallons to an altitude of 50 feet, or enough to furnish an irrigation, during the season, of 6 inches upon 15 acres. It will be seen that this estimate agrees with Mr. Vick's experience to the letter.

The most profitable reservoir for use with a wheel of this size would be one about 65 feet square, on the average interior slope. With a depth of 8 feet such a basin would hold 250,000 gallons, and afford the means of irrigating 5 acres at one time with 2 inches of water.

It is customary to use an open ditch for the distribution of the water: it is more cheaply and easily prepared than any other method, and if there is any seepage, by reason of the porous condition of the soil, it is not lost, as, the ditch being on the highest ground, the water is all utilized; but it may be necessary to carry the water either across depressions or to a distant part of the field or farm, in which case it will be found preferable to use a 4-inch glazed drain-pipe than to make an open ditch. This pipe will easily and safely bear a head of 50 feet, and as the head will be but slight, if the water is allowed to run freely, the pressure will be very little indeed.

A 10-inch pipe, running free with a head of 16 feet, will deliver as much water as a secondary ditch which will occupy, with its banks, a strip of land 26 feet wide and convey water enough to irrigate 80 acres of land. So it will readily be seen that, for the small farm or market garden, where but 10 or 12 acres are to be watered, a 4-inch pipe will be sufficient to carry all the water that will be necessary, and by laying it two feet below the surface it will be beneath the reach of plough or spade.

About 50,000 gallons of water will ordinarily be required to give an acre of land a proper saturation, and no irrigation can be at all satisfactory which attempts to do any less.

As the gardener has often observed, both in the greenhouse and garden, a slight watering only proves to be an aggravation and oftentimes an injury, while the only benefit is derived from a thorough drenching, so in our climate, with ordinary soils such as are found to be advantageously cultivated, it will require about two inches in depth over the entire surface to make a useful irrigation of almost any crop. This, without making account of loss by leakage and by evaporation, will amount to 50,000 gallons in round numbers.

The useful application of water by irrigation is a knack, — I had almost said science, — requiring observation and practice to carry it out with any measure of success. It is manifestly impossible in a paper like this to make anything more than the most general allusion to it.

For the grass crop, water is easily laid on; two waterings, in ordinary dry summers, will insure a second crop each year, fully equal to, if not in excess of, the crop usually secured as the first one; besides, the possession of these appliances would positively assure the farmer of two heavy crops of hay the same season, where one is sometimes a failure and often long in doubt.

It may therefore be moderately estimated that two tons of hay per acre could be secured, in addition to what is now obtained, and this, upon ten acres, would amount to 20 tons of hay, as a modest estimate of the yearly advantage of the possession of these facilities for irrigation. If the land otherwise has proper culture and nourishment, this increased yield would amount to 40 tons. There is positively no way in which our dairy farmers can so greatly increase the productiveness of their grass land.

For vegetables and small fruits the value of water would be greatly increased in dry years, while for strawberries the benefit would be greater than anything of which our cultivators have hitherto dreamed.

Drouth is the constant dread of the strawberry grower, as the strawberry is a thirsty plant, and seldom gets water enough.

Ten years ago the writer suggested sub-irrigation as beneficial for the strawberry, and prepared a plan for the scheme, but it met with no response. Within a few years, a large grape-grower, Mr. G. G. Briggs of Davisville, Yolo county, Cal., has tried sub-irrigation for the grape upon 400 acres of vineyard. With us, our grapes cannot be made too dry, but with the Californian, irrigation makes fine large grapes for the table or for raisins.

Ordinary irrigation has some disadvantages in such a vineyard: the surface is rendered, for the time, soft and muddy. The roots of the vines must run deeper into the soil than with us, as the upper twelve inches of soil is utterly devoid of moisture, being simply a body of dust all summer long; it has been observed that irrigation, as commonly practised, has had the tendency to encourage the growth of the roots nearer the surface than was consistent with safety.

At Hofwyl, near Berne, Switzerland, a tract of bog was reclaimed, by under-drainage, and the mouths of the outlets were so fixed that they could be stopped at the pleasure of the proprietor, so that, when the surface of the soil became too dry, the water could be retained and, on closing the drains, it would flow back and saturate the earth sufficiently to irrigate the crop. Mr. Josiah Crosby, of Arlington, has tried the same plan, with useful results.

One great advantage to be attained by sub-irrigation will be to obviate the enormous evaporation and consequent loss of heat that is sustained whenever the surface of the ground is moistened in summer. The loss both of heat and moisture by evaporation is surprising when it is carefully considered. This refrigeration of the earth and air is unfavorable to the best results in all cases where a high temperature is requisite for success.

This mode of irrigation has been tried to a limited extent at Los Angeles and promises good results. The irrigating pipes used there are continuous, laid with a machine, at the rate of 1,600 feet per day, with the labor of three men. The material of which the pipe is made is a composition of Portland cement, lime, sand and gravel, with a little potash and linseed oil. The pipes are laid from 18 inches to 24 inches below the surface, in a line parallel with the trees or vines to be irrigated; opposite each tree or vine a plug is inserted in the top of the pipe, which plug is perforated with a small hole, and over this a piece of larger pipe is placed, reaching to the surface and open at the bottom. The distributing pipes are connected with main pipes which lead from the reservoir, and thus the only labor requisite is in turning the water on and off.

At a trial with an orchard of three acres of young trees, which was piped in this manner, a thorough irrigation was effected in thirty minutes, with the expenditure of 400 cubic feet of water, or less than 3,000 gallons. Such an application twice a month had caused a growth of twice the size of trees of the same age, planted in the same soil, with the same cultivation, but irrigated in the usual manner by surface irrigation.

By this method no water appears upon the surface and the ground does not cake and bake with the heat of the sun; there is no needless loss of moisture or of heat by evaporation, and yet the land remains moist and mellow.

Another great advantage is in the fact that this method of irrigation encourages the penetration of the roots to a greater depth than is the case with ordinary irrigation, which induces them to spread near the surface, to be easily and injuriously affected by the intense heat of midsummer.

If this system proves to be all that it now promises, it will be possible to irrigate 9,000 acres of vineyard or orchard with one cubic foot of water per second, which is a degree of economy and efficiency not dreamed of hitherto. From these results there is every reason to expect that, if a strawberry bed be formed as

usual, with the addition of an inch drain tile, laid with proper joints 18 inches below the surface of the middle of the bed, and so contrived that water could be turned into it with just pressure enough to fill the pipe, the most satisfactory and perfect irrigation would be attained with the least expenditure of water.

In laying drain tiles for sub-irrigation, if the whole joint is left loose and unpacked the water will run so freely as to prevent its perfect distribution. It is the better method to determine how often it will be requisite to leave an opening; ordinarily it will be sufficient to leave a vent at every third or fourth joint. If the other joints are closed with cement, then, in case of any changes or repairs, it is equivalent to the destruction of the pipe to attempt to do anything with them; but if some old woollen rags be torn into strips and wound around each spigot end until it is a snug fit for the socket, it will make a joint tight enough; one that will constantly grow tighter, and still be easily loosened in case it is necessary for removal or repairs. At the joint where it is intended for the water to find vent have some strips of felt which will be thick enough to pack the pipe and long enough to nearly encircle it, leaving a small opening at the top through which the water can escape. Over this opening place a cover like an old preserve can, having a scallop cut out of opposite sides of the upper end; this will serve as a shield, and also as a reservoir to hold a fixed amount of water which will facilitate the complete saturation of the soil.

Some writers have injected the idea into their descriptions of irrigating works "that the running streams should be tapped so that the water should flow in (to the canal) from the bottom of the current when it is most charged with sediment." This is of a piece with a good deal of modern science that is assumed and taught in schools and text-books.

This dictum that sediment bearing waters should be used for irrigation has passed from one to another, and has been taught by scientific men, who seem to forget that the word science signifies a knowledge of the nature of things, and that the men most familiar with the nature of things are too busy to write books.

The truth of the matter is that all waters which are heavily charged with sediment are a positive injury to any useful vegetation. The willow and cotton-wood are about the only things which can survive an overflow of such earth-burdened waters.

Whenever irrigating waters are heavily charged with silt or sediment it becomes a question of great difficulty how to remove it.

This is particularly true of some of the old mining ditches of California, as well as the great canals that are supplied from the Ganges. The waters of this great river bear more sediment than those of any river hitherto examined, excepting the Sacramento, which owes the immense quantity of sediment borne by its waters to the pernicious practice of hydraulic mining, which, until recently, was extensively carried on at the head waters of its principal affluents. It has been estimated by English engineers that the waters of the Ganges canal alone bear along 13,000 cubic yards of silt per day.

These sediments, when coarse, are borne along by a violent stream, whose grade is five inches per mile, and which, when it pours over the surface, covers every green thing with a bed of fine sand. The lighter calcareous muds are not so easily thrown down, but pass upon the land in the form of silt, the impalpable particles of which are drawn by the percolation of the water into the interstices of the soil, which become so tightly closed as to prevent the free entrance of the air, and ultimately, the absorption of the irrigating water; the whole surface becomes coated with a crust of baked clay which is alike impervious to water or the atmosphere and surely destroys all the finer grasses and vegetables.

This difficulty has proved to be the chief drawback with all attempts to utilize town sewage by irrigating grass lands: the fine particles of solid matter are borne by the water and, although so fine as to be freely transported by the current and impossible of extraction by any method hitherto tried, yet they quickly close all the interstices of the soil with a mass of mud. This is itself of a fertilizing nature; yet, by the exclusion of the atmosphere, vegetation is speedily destroyed. In this manner the very object sought to be attained is defeated: there can be no purification of sewage, by irrigation, unless light, air and vegetation can act in conjunction with the soil in the work of eliminating and usefully combining the impurities with which the sewage is laden. This is the result of the best experience and therefore the best scientific authority.

In a series of carefully conducted experiments made in England some years ago, it was clearly proved that in the irrigation of grass land no advantage could be discerned in the quality or quantity of the crop when sewage was used for irrigation, over the results obtained by the use of pure water from the river, although chemical analysis showed the sewage to be highly charged with

fertilizing elements, and therefore that it should be, according to scientific deductions, the more valuable for irrigating purposes.

A knowledge of the nature of things teaches us, very conclusively, that the elements necessary for the encouragement and support of plant life must not only be present in the soil or the waters with which it is irrigated, but it is essential that they should be in proper condition for assimilation by the existing growth of vegetation.

It is finally conceded by those who have had the best experience in such matters that sewage irrigation cannot be an assured success until some convenient and effectual method can be devised to extract the solid particles from the water.

The ranchers among the foot-hills of California, who irrigate their land with water from the old mining ditches, in which the waters are often loaded with sediment, are obliged to resort to various expedients to precipitate the sediment before using the water; otherwise the soil would speedily become coated with an impenetrable covering of clayey mud which excludes both air and moisture, and defeats the very purpose of the irrigation.

Thus the intelligent cultivator has been taught, by the very nature of things, that all sediment should be extracted as far as possible from the water before it is admitted into the irrigating ditches, while scientific writers are inculcating the importance of using water which is the most highly charged with sediment. Permeability of the soil to the air is as requisite as the percolation of the water itself.

There is no disputing the proposition that sediment as borne by all rivers contains the elements of fertility, but it is for a future crop and not for the present one; irrigation is mainly used, or would be with us, for the growing crop.

Barren and sandy wastes have been reclaimed and rendered fertile by the deposit of the dense sediments from muddy rivers and canals; but this is a different kind of an improvement entirely.

These sediments are called silt when they are so fine and clayey as to be borne by ordinary river currents through the valley lands. Silt is the detritus of the hills and mountains under the destructive action of ice, sun, frost and rain.

How it is produced, transported, constituted, and utilized for the comfort and wealth of man is a question as broad and comprehensive as the one we are considering today; and, while kindred in its nature, still it is rather a digression to touch upon it.

It is simply necessary to add that, where sediment-bearing waters have been used upon the growing crops, the most observing cultivators have found, as the result of their experience, that only alfalfa, rye and other rugged grasses can stand it, and these become so coated with mud that cattle will refuse to eat the hay until driven to it by hunger.

The irrigating season in England is almost altogether during the colder months of the year, beginning in November and ending in March or April. When the grass begins to vegetate, the intervals of irrigation are shortened, until the grass is sufficiently grown for cutting or pasturage, when it is withdrawn altogether.

By this means a good crop of grass is produced on those water-meadows very early in the spring, before the dry upland grass has begun to start, and rich feed is thus furnished for flocks and herds.

Value of Water for Irrigation. —When we endeavor to determine the actual value of water for the purpose of irrigation we are in a worse quandary than in trying to estimate the value of commercial fertilizers.

If by the use of water a valuable crop can be raised, with absolute certainty, which would otherwise occasionally fail for the lack of summer rains, then no price at which water is sold would be considered too dear.

The price of water from the Boston water works is 20 cents per 1,000 gallons, at which rate an irrigation of 1 gallon per square foot would cost only $8.71 per acre. If this would save a strawberry crop, who would higgle at the cost? Even for the hay crop it would pay; yet this is four times the highest price ever paid for water in Spain, and recorded as showing the extravagant prices paid in seasons of scarcity. Some of our cultivators near Boston have been glad to obtain water for irrigation in dry times even at this large price.

The charge for water in Chicago is 8 cents per 1,000 gallons, which is twice its cost to the city, and therefore a source of profit. This is a rate that the market gardener can afford to pay when it is used carefully and prudently. In this connection it may be well to look at the prices at which water is furnished to farmers in various irrigating countries. These are rates charged by the grand canals which are hundreds of miles in length, distributing water by the million cubic feet, and irrigating hundreds of thousands of acres; they may not prove to be much of a guide in the direction

in which we are looking, still they are useful in giving us a comprehensive view of the matter.

In India, by the West Jumna canal, the maximum charge is $2.50 per acre, minimum charge 67 cents, and the average charge is $1.25 per acre per annum; by the Bari Doab canal the maximum charge is $2.94 per acre, minimum charge 75 cents, and the average charge is $1.17 per acre per annum; by the Ganges canal, the maximum charge is $2.20 per acre for sugar-cane, minimum charge 60 cents for cereals, and the average charge is $1.21 per acre per annum, which rate would be equivalent to $\frac{1}{4}$ of a cent per 1,000 gallons, if the land received four irrigations per year, which is about the average for crops.

In Italy the rate for water varies from 60 cents to $3.00 per acre per year. From the Cavour canal, recently constructed, the charge is from $87.39 to $69.91 per cubic foot per second for the year, which is equivalent to $\frac{1}{3}$ to $\frac{1}{4}$ of a cent per 1,000 gallons.

In Spain there are the greatest fluctuations in the price of water, from the fact that water is there a necessity every year, while in some years the supply is scanty; many of the irrigation works and canals being in the hands of those not owners of the soil, it is sold to the highest bidder, instead of being justly and impartially distributed among those who are accustomed to use and depend upon it.

In some districts the old Moorish works belong to the proprietors of the soil, as an appurtenance not susceptible of alienation therefrom; and, in these cases, the cost of the water to the proprietors is simply the cost of maintaining the canals and works.

In Lorca and Elche there are daily exchanges for the sale of water, and in the year 1861, which was a year of drouth, the price ran as high as $11,000 per cubic foot per second, which large sum, when transposed into gallons, is about $4\frac{4}{10}$ cents per 1,000 gallons, deliverable, for the year, or $8\frac{8}{10}$ cents per 1,000 gallons during the growing season.

From the Henares canal the annual rate is fixed by the government at $1,875.00 per cubic foot per second, which would be a little less than 0.74 of a cent per 1,000 gallons deliverable. An irrigation of 2 inches would cost, at that rate, 37 cents per acre, and, as the irrigating season continues for only one-half of the year, the cost of the water would be practically double these figures, unless the cultivator could utilize the water during the winter months.

At Lorca the same amount would cost $2.50, and at Alicante, it

would vary from 25 cents to $5.77 according to the scarcity of the water.

From the new canal, at Navarra, the farmers have agreed to pay $3 per acre annually for a total irrigation of 10 to 12 inches, which would bring the cost of an irrigation of 2 inches to from 50 cents to 60 cents per acre.

From the San Joaquin and Kings River canal, in California, the rates are fixed by the area irrigated: for cereals, $2.50 per acre, per year; for alfalfa, $3 per acre; for market gardens, $5; wild grass land, 75 cents, and for the irrigation of second crops, $1 per acre. In Yolo county, the cost of water ranges from $1 to $3 per acre per annum.

These figures are instructive as showing how cheaply water can be furnished under favorable conditions of supply, but of course, they do not give us an adequate idea of the cost of water to husbandmen who are obliged to raise their water by mechanical means, as has been done in Egypt from the earliest ages, and is now, to a greater extent, in Spain, where, of 2,840,000 acres irrigated, only 500,000 acres are returned as irrigated from the principal canals, by gravity, leaving 2,340,000 acres to be irrigated by all sorts of mechanical contrivances, mainly by rude wheels having jars or buckets secured to their perimeters, and driven either by the current of the river or by animal power. No means exist of ascertaining the cost in these cases, but it is safe to assume that, if it will pay to pump water in one place when it is wanted, it will in another, more especially when the salvation of a valuable crop depends upon its being done.

There is probably more land irrigated by mechanical means in Spain than was ever irrigated in any way throughout the whole valley of the Nile, which we are accustomed to think of as the region where, of all places in the world, irrigation is most extensively conducted.

How shall Water be Applied? — In valley lands, where the surface is a broad plain with a gentle and uniform grade, the same definite plan can be carried out in each case; but upon our New England farms, with their more irregular surfaces and steeper slopes, no definite plan can be laid down.

Each case must be considered separately, and by an experienced person, if one would not obtain his information in the bitter and costly school of experience, which some men strangely prefer.

Grass land is easily managed, if the surface is quite or nearly

flat, by forming it into planes of from 30 to 40 feet in width, having a slope in each direction of 1 to 12 or 15. On the ridge of these planes the water can be conducted, and allowed to flow over the surface. The surplus which is not absorbed by the soil will run into the depression and pass away by a drain, which must be prepared to prevent the settling of stagnant water.

On lands which have nearly a uniform grade of less than 12 feet to a mile the cheapest plan will be to throw up ridges or levees from 6 inches to 12 inches high and with 20 feet base, which must be carefully made at a uniform level, each levee to flow the water back to the base of the levee next above. This is called the check-levee system. By this means the entire surface can be irrigated at less cost per acre, for labor, than by any other system. Another method is to divide the entire area into small plots or compartments, separated by ridges of earth, with broad bases; these plots are filled alternately with water as required, where it is permitted to soak away into the soil. In all of these cases the levees are constructed with scrapers, and with so broad a base and flat a slope that all sorts of farm machinery may be drawn over them without difficulty or obstruction.

There was a very elaborate system of canals and ditches, with cross-furrows for distribution, which was introduced upon the Dos Palos ranch, of 5,956 acres, in the San Joaquin valley, California. The cost of the distribution canals and ditches alone was over $50,000, or about $10 per acre. This work attracted a good deal of attention, and, in the report of the United States Commissioners upon the irrigation of the Pacific coast, made in 1874, it was noted especially for its excellence; very elaborate drawings were also given illustrating the plan of construction, which was highly commended.

In 1880, however, the engineers of the State of California reported that the whole experiment had proved to be a disastrous failure and had been abandoned. The system of secondary and tertiary ditches, with the cross-furrows, had been swept away and a system of check-levees introduced, at a much less cost which was about as follows, per acre: —

Earthwork	$1 64
Waste and drainage gates . . .	0 51
Total	$2 15

The average cost of the primary and lateral canals, including their waste and side gates, was about	4 00 per acre
making the total cost about	$6 15 per acre

as against $10 per acre, the first cost by the previous plan; the total loss being about $20,000.

One great evil, attending the introduction of this or of any other new method, arises from the great inclination of well-meaning people to accept the sanguine expectations of their promoters as facts accomplished, and to herald them as successful, when the result proves them to be far from it; this only causes subsequent disappointment, if not loss, to innocent parties when the true facts are developed.

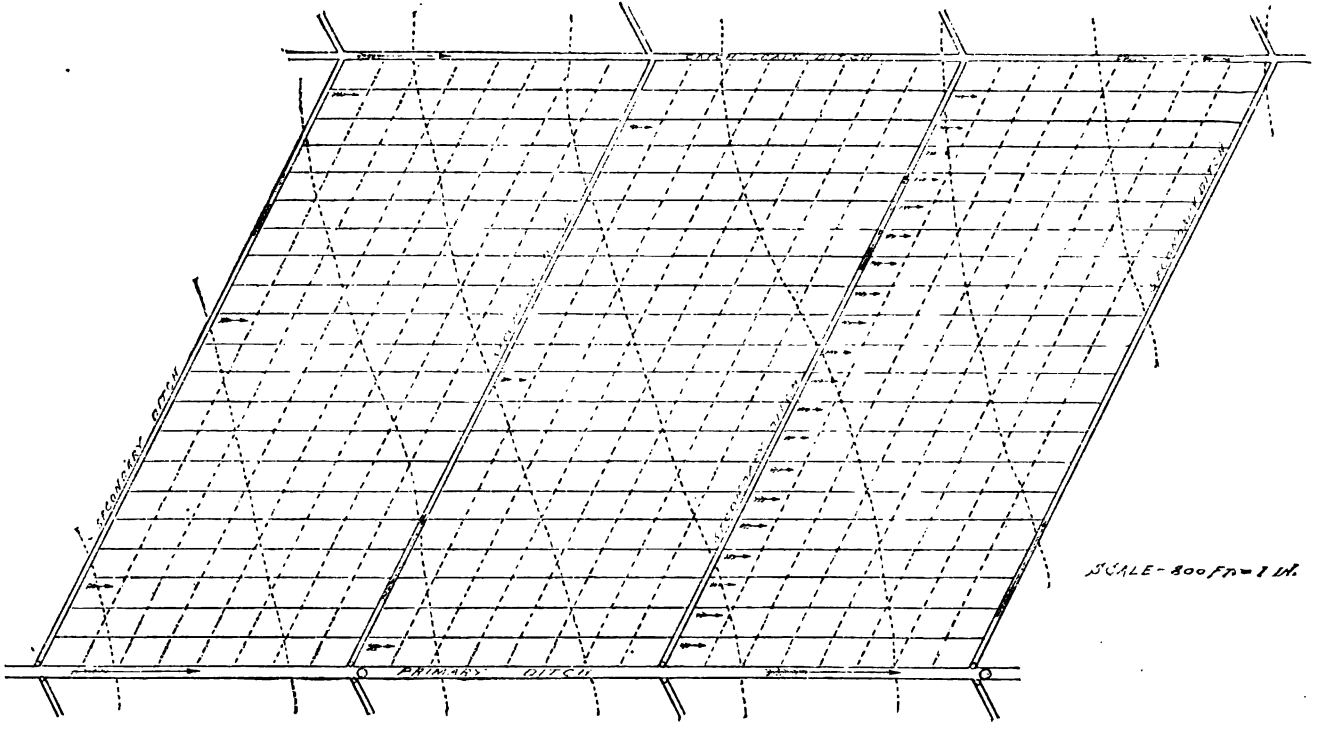
Of the accompanying drawings, the first shows a section of this mode of irrigation as first executed, with its system of primary, secondary, and tertiary ditches; the dotted lines show the cross-furrows, by which the water was to be distributed upon the land.

The second plan shows the method which was substituted; the dotted lines show the check-levees thrown up along the contours of equal elevation, the water being supplied direct from the primary ditches. If the surface of the land is steeper than 1 in 12 then the water can be taken around on the highest contour level that can be reached, and suffered to flow over the land in a thin sheet until the land is well irrigated.

Where the water has thus been permitted to flow in this manner for two or three weeks at a time, during the winter, if the weather is not intensely cold, — with intervals of exemption, during the milder weather, when the soil could become comparatively dry, — a great improvement in the quality as well as the quantity of the grass, has been noticed. An uninterrupted flow of water has proved to be unfavorable for the choice grasses and only served to encourage the growth of coarse aquatic plants. The flow of the water in winter has been found to counteract the action and intensity of the frost, to a great degree.

To use water successfully on a tilled crop is learned more readily and effectually with a hoe than with a book. One can get but a very imperfect idea of the operation from any sort of a description.

Arable land, to be irrigated, must be ploughed so that the furrows will lie along the slope of the surface, at a grade of not more than


SECONDARY DITCH
PRIMARY DITCH
SCALE - 800 FT = 1 IN.

CHECK LEVEES
CHECK LEVEES
CHECK LEVEES

one foot in twelve. Of course the upper ends of these furrows will commence at intervals beside the ditch, which is higher up than the land. Small holes or checks are inserted in the side of the ditch and stopped with a plug. One of these being removed, the flowing stream is guided by the hoe into the first furrow, and followed in its course along the line by the irrigator, who prevents the stream from getting astray as it works from side to side, sometimes pausing for a moment as the thirsty earth sucks it up, and then, overflowing the slight dam, running briskly to the next hollow; he keeps it in a direct channel of its own, and carefully prevents two or more of the streams from uniting in a single channel, which, if allowed to happen, creates by the union a small-sized torrent, and does more or less damage before it can be stopped. An adroit man will manage at the same time several streams, running parallel with each other.

A very good and successful manner of distributing water upon hoed crops is to plant the rows at a slight grade, as specified before, and when irrigating, to pass the water from the highest to the lowest grade in a wooden box, either $8'' \times 10''$ or $10'' \times 12''$. In the sides of this box holes 1 inch to $1\frac{1}{2}$ inches in diameter are bored, midway from the top to the bottom, and stopped; blocks, with handles for convenience of manipulation, are inserted below each of the three or four upper holes, and the plugs are withdrawn. When the water is let into the box or sluice the effect of the upper block is to dam the water back sufficiently to cause it to run out of the hole, it may be on either side (to be followed along the row as before described). The stream also flows over the block, and any surplus, more than can run through the holes, thus passes to the next, and so on until the water is all distributed. When a line of plants has had water enough, the block on that line is removed and the water ceases to flow as it passes down the sluice below the level of the holes. This is by far the most workman-like mode of distributing water; the work is not only better done, but the necessity is obviated of making so many openings in the irrigating ditch. This is called the "tapon" system.

The general method is to conduct each stream until it becomes finally absorbed by the soil and then permit it to run as long as may suit the pleasure or commend itself to the judgment of the gardener. But it by no means follows that each stream must receive the constant attention of the operator while it is running: a skilful irrigator quickly sees how he may set numerous streams running safely, and leave them while his attention is directed elsewhere.

Whatever the locality and whether the irrigation is to be regular or occasional, the methods to be employed are substantially the same, varying only with the circumstances peculiar to each case.

The utility of irrigation on a farm or market garden can be quickly determined by the cultivator from a brief experience; but in all cases where it has been tried judiciously it has proved to be a satisfactory and paying investment.

Cost of Labor for Irrigation. — This is difficult to determine, because in those countries where irrigation is largely conducted, labor is about the cheapest thing there is, and no accurate accounts or statistics are kept.

In the San Joaquin valley, California, the conditions as to the value of farm labor more nearly approximate to our own, and, in several instances, the cost of laying on the water has been noted for reference.

The labor of one man was sufficient to water 30 acres in twelve hours, with a depth of 0.45 feet or 5.4 inches, at a cost of 5 cents per acre.

Five hundred and twenty-three acres were irrigated in twelve hours by the aid of 3 ditches, at an expense for labor of 3 cents per acre, — quantity of water not noted.

On 1,500 acres of grass land prepared with the check-levee system, when the levees were badly infested by the gophers and considerable expense was required in repairs, the cost for labor was about 13 cents per acre.

One foot in depth was put upon 300 acres in 10 days, at a cost of 10 cents per acre.

In Yolo county, where 9,000 acres of farms and vineyards are irrigated, the cost for labor is from 20 cents to 30 cents per acre per annum.

In the Mussel slough country, the cost of distribution was from 25 cents to $1.00 per acre, averaging about 50 cents.

The Amount of Water Required for Irrigation. — This will vary greatly with the locality, character of the soil, amount of rainfall and its distribution, the amount of percolation, the temperature and the crop.

In Italy, as well as in India, the husbandman is not dependent entirely upon irrigation for his harvest, as the total amount of rainfall is very considerable in both countries; but the amount of water furnished by their irrigating canals is so vast and the price so low that the most prodigal use and waste are permitted. A fair

estimate of the best results obtained in those countries would be from 200 to 250 acres of cereals irrigated with one cubic foot per second.

In Spain, however, although the extreme dryness of the climate renders cultivation of the soil well-nigh impossible without irrigation, the amount of grain irrigated by one cubic foot per second is as much as 240 acres, owing, probably, to a more economical use; in one district, where water is very scarce, as many as 1,000 acres have been successfully irrigated with one second-foot.

Considering the relative summer temperature and rainfall of Eastern Massachusetts, it is safe to conclude that this volume of water would adequately irrigate 400 acres in any year; but this amount will vary with the year, the crop, and the soil.

In the great valley of California it has been estimated that 12 inches of water will yield four cuttings of alfalfa (meaning by this, water of irrigation in addition to the average annual rainfall of from 10 to 15 inches), which amounts to 3 inches of water for each crop; that amount is not so effective as 2 inches would be in Massachusetts.

Taken altogether, one year with another, it is safe to assume that one gallon of water per square foot will be adequate for one thorough irrigation, and, making allowances for loss by leakage and evaporation, it is safe to calculate upon 50,000 gallons per acre. If grass land is irrigated once in six weeks a regular supply of 10,000 gallons per day will successfully irrigate $7\frac{1}{2}$ acres in the driest year.

In gardens and in the cultivation of vegetables, it is not likely that this estimate would be varied much either way: some vegetables might require more water, but the special mode of irrigation required with tilled crops would tend to a more direct application of the water to each plant, and a consequent economy in its use.

Under ordinary circumstances it will be merely requisite to make good the deficiency of the rainfall below the monthly average.

The difficulty with us in our climate is not that we have too little rain in the aggregate, but that it is so unevenly distributed. Oftentimes by far the larger part of the annual rainfall will come in the autumn and early winter, when it is far less useful than in the spring and early summer. Sometimes as much as one-fourth of the annual rainfall occurs in one month in summer, and then the crops will fail because of excessive dryness during the following months.

Now the problem for us to solve is, how much of the annual supply of moisture is of actual use in support of vegetation, and how much water of irrigation will be required, either at one time or in the aggregate, to average up these fluctuations and save the crops. This can best be estimated from the records showing the deficiency of rainfall, together with the greatest amount of precipitation in single storms. The first topic to consider in this connection is the relative distribution of rainfall.

Distribution of Rainfall. — During the past forty years the average annual rainfall in the city of Boston has been 50.01 inches, while within thirty miles of Boston it has been about 45.57 inches, with a monthly average of 3.79 inches; varying from 3.22 inches in May to 4.77 in August. Taking the months when moisture is more directly useful to growing crops, say April, May, June, July, and August, the actual amount averaged, during the forty years, an aggregate for these five months of 19.46 inches, while the average precipitation due to those months as $\frac{5}{12}$ of the year amounted to 19.95, so nearly do the monthly and aggregate rainfalls equalize themselves in a long series of years. But the difficulty, for which we are seeking a remedy, arises from the fact that, while the figures average up well finally, yet the surplus of last year is of no manner of use to relieve this year's drouth, neither does the probability of a superabundance next year make it any better.

One would naturally say, from a casual glance at these averages, that the rainfall was pretty uniformly distributed; but, upon a more careful inspection of the monthly fall, we see that it varies from 0.58 up to 12.38 inches; that in eight years, during the month of May, the rainfall was less than 2 inches, while the average for that month is 3.95 inches. In seven years the rainfall for the month of June was less than 2 inches, while the average for that month was 3.48; the largest rainfall observed in June was 8.09 inches in 1858. In seven years the rainfall for the month of July was less than 2 inches, while the average for that month was 3.54, and the largest fall observed was 12.38 in 1863. In five years the rainfall in the month of August was less than 2 inches, the smallest being 1.18 in 1881, and the largest fall being 10.48 in 1872, against an average for that month, in forty years, of 4.77 inches. Notwithstanding all this diversity and irregularity, the total annual rainfall appears to be gradually but steadily increasing, whenever closely observed; thus the average rainfall in the Eastern States for the decade 1841–50 over that of 1831–40 showed an increase of 6 per cent.

The total rainfall in Boston, for the twenty years from 1862 to 1882, exceeded that of the twenty years from 1842 to 1862, by $9\frac{83}{100}$ percent. These observations were made by but two men for forty years, and the great variation cannot be attributed to difference of methods.

In New York and adjacent States the increase for the decade 1857–66, over that of 1847–56, was 9 per cent. In Salt Lake valley, Utah, the increase in ten years has been shown to be fully 10 per cent, and has not only been remarked by the farmers but has actually caused a rise of 12 feet in the Great Salt lake.

In 1880 the deficiency of the rainfall in Boston, below the average for forty years was, for the year, 11.12 inches, for the five growing months it was about $7\frac{3}{4}$ inches, and during three consecutive months the deficiency was 6 inches.

In 1881 the deficiency for the year was only 0.79 of an inch, for the five months it was about 6.80 inches, and for two consecutive months the deficiency was $4\frac{1}{8}$ inches.

In 1882 the deficiency for the year was 6.19 inches, for the five months it was 7.60 inches, and for three consecutive months it was 5.75 inches; so that the deficiency for the year was brought into the three months when most rain is required, viz., June, July, and August.

In 1883 the total deficiency was 14.53 inches, for the five months it amounted to 8 inches, while $6\frac{1}{2}$ inches of this were in the three consecutive months of June, July, and August. This proved to be the climax of one of the driest continuous periods of which there is any record.

Now with regard to the rain that falls. It has been observed that it is the heavy rains, giving the earth a thorough saturation, that afford a beneficial influence upon vegetation; therefore let us see what is an average heavy rain.

During the past twelve years, in the city of Boston, the largest amount of rain that has fallen in a single storm was 5.43 inches, — on the 20th of November, 1876. The heaviest monthly storms during this period have yielded more than 5 inches of precipitation but two times; from 4 to 5 inches, 4 times; from 3 to 4 inches, 10 times; from 2 to 3 inches, 21 times; from 1 to 2 inches, 65 times; from $\frac{1}{2}$ to 1 inch, 28 times; less than $\frac{1}{2}$ an inch, 15 times; from which we see that 37 of the principal monthly storms afforded more than 2 inches, 43 less than 1 inch, while 65 gave from 1 to 2 inches.

The average of these storms for each month has been, during this period, for April, 1.49 inches; May, 1.20 inches; June, 1.82 inches; July, 1.36 inches; August, 2.04 inches.

These are the storms which furnish the most beneficial supply of water during the months in which the rains have their most useful effect; and it is more than probable that fully one half of the annual summer rainfall comes in little showers that afford but very small benefit to vegetation.

From the figures here presented it must be quite apparent that an irrigation of 2 inches is more effective as a supply of moisture than the average rain-storm.

It is also a fair presumption from these data that a total irrigation of 4 inches during the three dry months of 1883 would have kept the moisture in the soil fully up to its average amount.

It is the percolation of the moisture well into the soil that is to be desired, and not a continuous moistening of the surface. For this reason a ceaseless sprinkling is not so beneficial as an occasional saturation; and the best time to irrigate is immediately after a shower which has simply wet the earth without drenching it. A continual moistening of the surface will only promote evaporation and refrigeration of the soil, which, in a temperate climate, is to be avoided with all crops requiring warmth as an element of success.

Upon the estimate that 4 inches of total irrigation would have maintained an average condition of moisture in the soil during the three dry months of 1883, as before stated, it would have required two irrigations of 2 inches each, at intervals of 45 days. During this period, a 16-feet wheel should deliver not less than 675,000 gallons of water, at a height of 50 feet above the surface of supply, and would thus afford ample irrigation for 13.5 acres of land. This approaches very closely to the previous estimate.

There need be no hesitation in assuming that the cultivator who could have placed 4 inches of water upon his fields, during the past season, would have been more than repaid for the entire outlay requisite to accomplish it, besides enjoying the pleasurable satisfaction of seeing his crops increase, rather than diminish, under the continued bright sun and dry weather.

This irrigation would cost, probably, in interest on investment, repairs and depreciation, about 3 cents per 1,000 gallons, or $3.00 per acre; expense for labor not over $1.50 per acre, making a total of about $4.50 per acre, which is all that it need to cost to irrigate land suitably situated and properly treated.

But, says one, my land is flat, I have no place to put a reservoir, I have no brook, and I need irrigation; what shall I do?

Go to the lowest place and bore a trial well, to see if water can be obtained in adequate quantities; if you can obtain a good well you are all right; if not you must buy water of somebody, or go without.

A well must be sunk that will yield 15,000 gallons per hour in an emergency; lay a line of iron pipes not less than 3 inches in diameter right through your land, placing hydrants at proper intervals. Procure a good, portable, upright, tubular, five-horse-power boiler, as rated by the boiler-makers, which will give you sufficient power; obtain a $7'' \times 12''$ direct-action steam pump with the necessary connections, and place the entire outfit properly in a suitable building at or over your well; this structure need not be large or expensive, but it should be strong and substantial, with all safeguards against accidental or incendiary fires. When you have done this you are ready for any emergency. If the drouth comes on and you want water, all that you have to do is to start your pump. Any intelligent man will quickly learn how to make steam safely, at a pressure of 30 to 40 pounds; and the pump will run itself if you only give it steam.

Have a stand-pipe connected with your works, so that there will be no danger of breaking things by starting the pump before the hydrant is opened. No general estimate of the cost of such works can be given that will be at all satisfactory. If it will pay to do at all, the true and economical way is to have it studied and planned by a competent person. The actual cost of pumping ought not to exceed 5 cents per 1,000 gallons, when the works are used as they should be. This would make 4 inches of irrigation cost, for water, $5.00; for labor, about $2.00; a total of $7.00 per acre for the season, allowing as much as 100,000 gallons to be delivered upon each acre during the time.

There are good reasons to expect that an injector may, after all, prove to be the most desirable and economical sort of pumping engine. An experiment, tried by the writer, gave an unexpected result. An injector was placed 20 feet above a reservoir in which the temperature of the water was 60°. The injector was started and the water drawn at the rate of 400 gallons per hour, when it was found that the temperature of the discharge was 82°, a rise of 22° in the temperature of the water, caused by the condensation of the steam necessary to lift it, which is a little more than 1° in temperature for each foot of elevation.

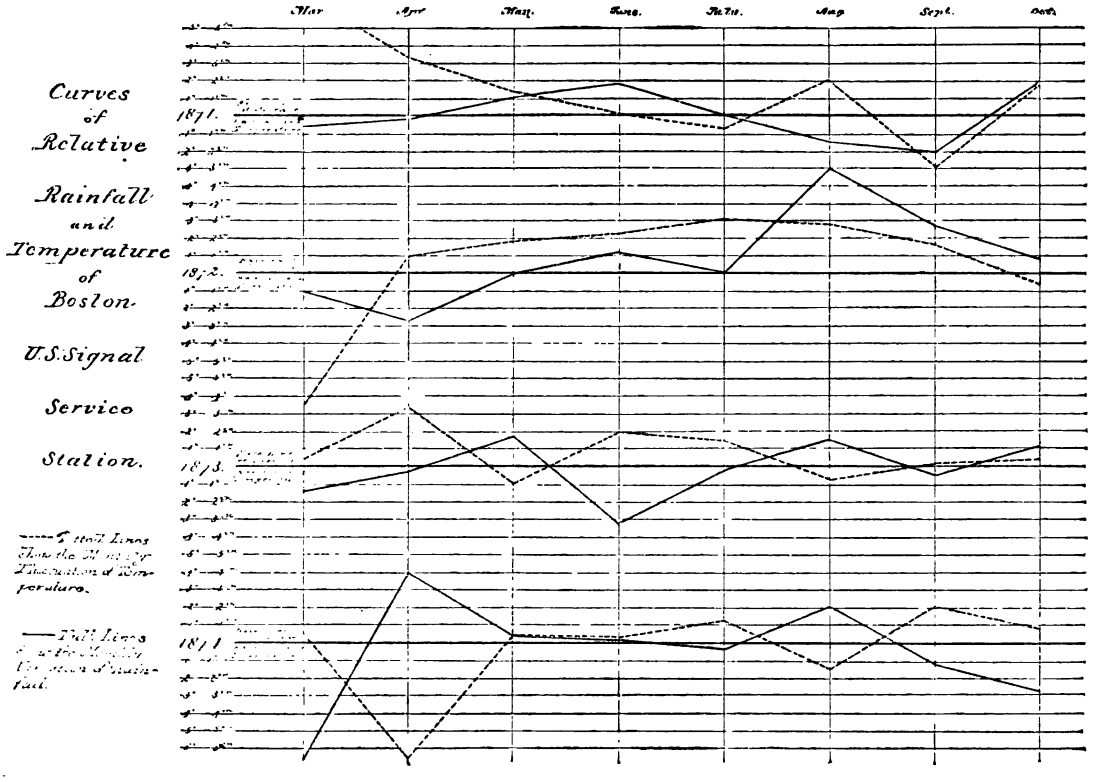
When it is considered that the great objection to the use of water from wells, for irrigating purposes in the heat of summer, arises from its low temperature, and that by this method all of the heat of the steam is utilized in elevating the temperature to a most desirable point, it is reasonable to presume that this mode of raising water may yet prove to be a favorite one with agriculturists, in such cases.

To raise water 50 feet will require a steam pressure of but 35 lbs. An injector of 1,000 gallons' capacity per hour will cost $25; one of 5,000 gallons, $65; one of 10,000 gallons, $75; and one of 15,000 gallons, $85. These machines are small, and therefore portable and cheap; they are not liable to get out of order, and merely require shutting the steam on or off; a simpler contrivance for pumping cannot be imagined.

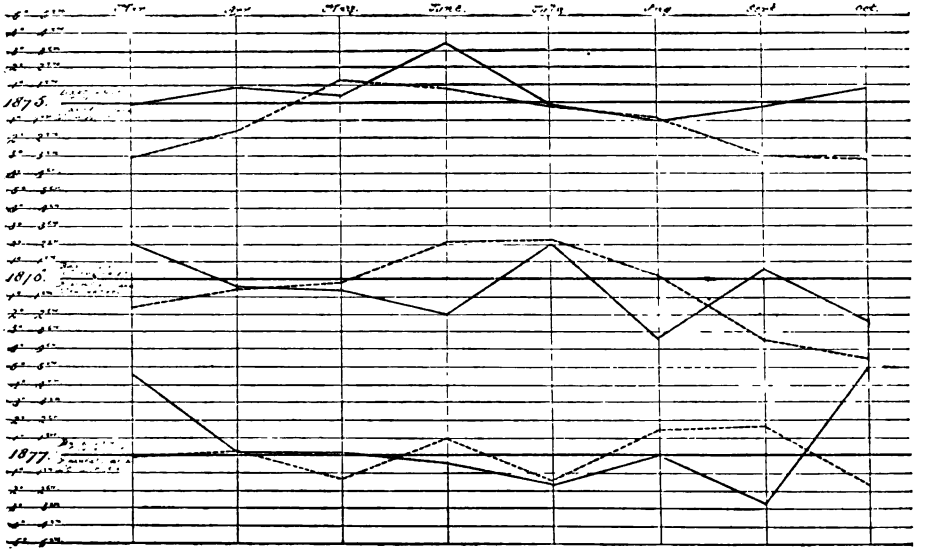
While it has been clearly shown how wide are the fluctuations in the annual and monthly precipitation of moisture, it will be necessary, for a full understanding of the relation that rainfall may have to fruitfulness, to consider also the relative temperature for the time being. Thus it will readily be perceived that a low temperature with a light rainfall may accompany a fair harvest; whereas a season of high temperature, with a moderate rainfall, may have a total failure of most crops; on the other hand, a low temperature and excessive rains will blight everything but the forage crops; while a high temperature, with great moisture, will stimulate an enormous growth of grass and afford no opportunity either to cure or to secure it, will promote the growth of mildew and all sorts of offensive fungi, and greatly retard, if not utterly prevent, the maturity of seeds of fruits, as well as the bearing wood and buds of trees and vines.

The forage crop generally requires more water and less heat than any other, and is often quite successful in years of the general failure of other tilled crops.

By the several diagrams accompanying, it has been sought to render apparent how a conjunction of these wide fluctuations of temperature and rainfall has been of moment in affecting the several crops as reported for each year. In these diagrams the assumed base line, to which both temperatures and rainfall are referred, has been employed to represent, at once, the mean temperature and mean rainfall for each month, as indicated by repeated observations, over a wide district, extending through many years. The oscillations of temperature are indicated by a dotted line,

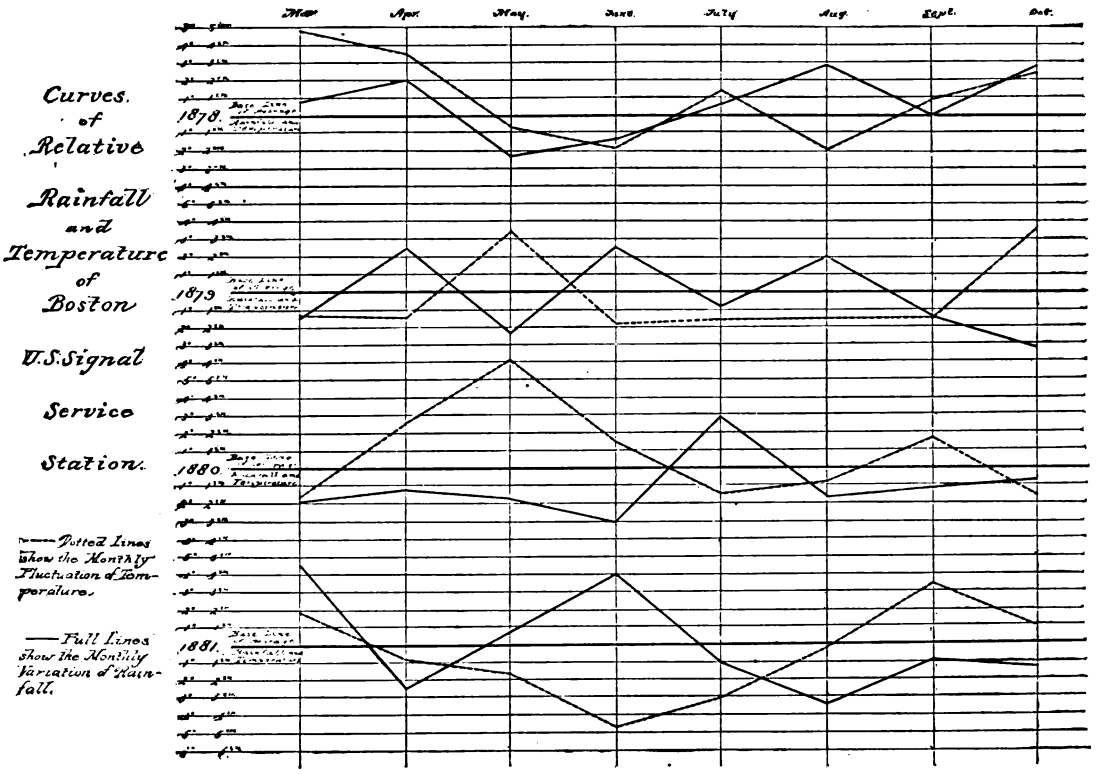

Curves of Relative Rainfall and Temperature of Boston. U.S. Signal Service Station.
Dotted Lines show the Fluctuation of Temperature.
Full Lines show the Monthly Fluctuation of Rainfall.
1871.
1872.
1873.
1874.

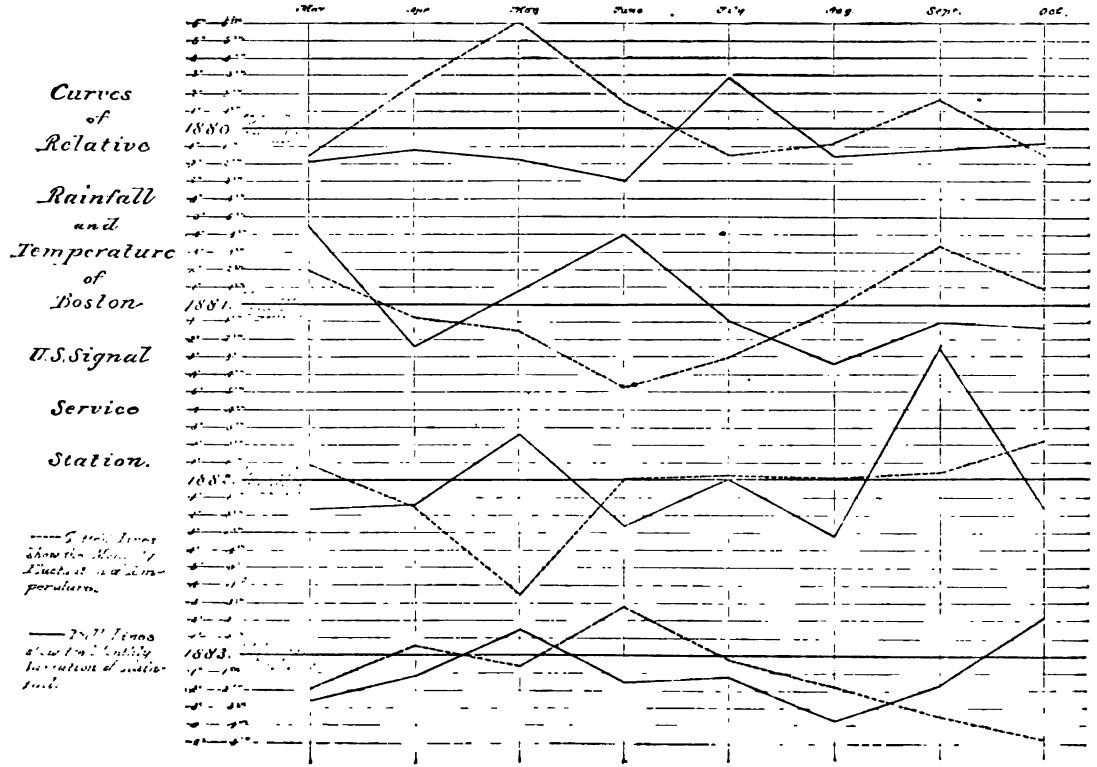
Curves of Relative Rainfall and Temperature of Boston U.S. Signal Service Station.



—— Dotted Lines show the Monthly Fluctuation of Temperature.

—— Full Lines show the Monthly Variation of Rainfall.


Curves
of
Relative
Rainfall
and
Temperature
of
Boston
U.S. Signal
Service
Station.
1878.
1879
1880
1881
Mar.
Apr.
May.
June.
July
Aug.
Sept.
Oct.
Dotted Lines show the Monthly Fluctuation of Temperature.
Full Lines show the Monthly Variation of Rainfall.


Curves of Relative Rainfall and Temperature of Boston.
U.S. Signal Service Station.
Dotted lines show the Means of Fluctuations of Temperature.
Full lines show the Monthly Variation of Rainfall.
May
June
July
Aug.
Sept.
Oct.
1880.
1881.
1882.
1883.

and of rainfall by a full line. As these are drawn above or below the base line, they indicate relatively an excess or deficiency, either of heat or moisture, or both, and a glance is sufficient to make it apparent to the eye whether the season was cold or hot, moist or dry. It will be found, in nearly every case, that there is perfect correspondence between the state of things indicated by the contrasted lines, and records made by observing men who noted the relative condition of the weather and the different crops at the time.

Diversion of Streams for the Purpose of Irrigation.— In the older and more thickly settled States of the Union the legal rights and limitations, to the use of the water of streams, are pretty well understood and defined. In the absence of any public grant, the language of Mr. Chief-Justice Shaw, of the Massachusetts Supreme Judicial Court, has been taken as the basis of the definition of riparian rights, in the United States, viz. : —

"It has sometimes been made a question whether a riparian proprietor can divert water from a running stream for purposes of irrigation. But this we think is an abstract question, which cannot be answered either in the affirmative or negative, as a rule applicable in all cases. That a portion of the water of a stream may be used for the purpose of irrigating lands is, we think well established as one of the rights of the proprietors of the soil along or through which it passes. Yet a proprietor cannot under color of right, or for the purpose of irrigating his own land, wholly abstract or divert the watercourse, or take such an unreasonable quantity of water, or make such an unreasonable use of it as to deprive other proprietors of the substantial benefits which they might derive from it, if not diverted, or used unreasonably."

The general application of this rule has been to divide the use of water into two kinds, natural and artificial. The natural use of water is deemed to be that for domestic purposes and the watering of stock. These wants must be met if men are to inhabit the earth, and therefore they are esteemed absolutely necessary and consequently natural.

All other uses, while they may be proper and conducive to happiness and lawful, are not necessarily indispensable to the existence of man or beast; in fact they could be very well dispensed with, as they are acquired uses, and therefore artificial. From these considerations, mainly, it results that water may be used from a stream, for purposes of irrigation and for manufactures, provided that a

sufficient quantity is permitted to continue in the channel, for the natural wants of proprietors below and for the preservation of fish.

By a recent decision of a California court, this principle was affirmed and a proprietor on a stream was enjoined from diverting all of the waters of a stream for irrigation; it being decided that sufficient water must be permitted to flow to supply the domestic wants and the stock of the riparian proprietors below.

If a spring flows on one's land, and the water runs over or through a neighbor's land adjoining, all of the water may be used for the supply of stock or domestic requirements. So with a stream flowing through one's land, the whole of the water may be consumed if the natural wants of the proprietor demand it; or the owner below may wholly consume, for his natural wants, what is left and comes to him, and proprietors below have no cause for complaint; but none of the water can be diverted for purposes of irrigation or manufactures until there is sufficient for the natural wants of all below.

When any of the water of a stream, so diverted for any lawful purpose whatever, is not consumed, it must be returned to the stream again within the premises of the person so diverting it. In the States and Territories where there are large areas of the public domain it has been the custom for any person who wanted to make any use of the water of a stream to divert any portion or the whole of it, whether he owned any land bordering on the stream or not. Valuable rights have thus been legally acquired, with no more effort than the simple posting up a notice on a tree, of the intention to take the water, and recording the fact with the county records.

To so great an extent has this abuse been carried in California that in two counties alone, those of Fresno and Tulare, where agriculture is dependent upon irrigation, there were three hundred and thirteen claims, for the control and diversion of the water of Kings river, that had been entered in conformity to law, amounting in the aggregate to 23,899 cubic feet of water per second; while the maximum observed flow of the river was but 9,030 cubic feet per second, and the minimum flow but 210; and the average for the year was but 1,719 cubic feet per second. Thus a paper claim has been set up, by these enterprising forestallers, to nearly three times the maximum flow of the river, and about fourteen times its average.

By the report of the U.S. Geological Survey of the arid lands of the United States it appears that the present and future wel-

fare of more than four-tenths of the area of the United States is dependent upon irrigation. It will be therefore quite apparent that, unless the rights to the waters of rivers and streams in the new States and Territories are more carefully guarded and regulated, there is more to be feared from a water monopoly than from a monopoly in land.

So much injustice and hardship have arisen, under this condition of things, that in the new constitution of California express provision was made prohibiting the further acquisition of what are termed water-rights; that is to say, rights to divert the water of a stream cannot be acquired without a positive grant from the State Legislature.

With regard to the right to water beneath the surface of the soil, the case is entirely different. You may sink wells on your own premises and draw water from them, even though such a use should be attended with the failure of your neighbor's well. Water can be appropriated to private use, to the exclusion of other persons, until it comes to the surface, and even then, unless it forms a perfectly defined stream.

When deep excavations or galleries have been dug for a water supply, in the gravel beds bordering upon rivers whose waters were used for manufacturing purposes, it has been held that such excavations intercepted streams of soil waters which were seeking the river even though they should stand at a higher altitude and at a lower temperature than the water of the river itself; damages have been awarded against the cities and towns making such arrangements for the source of their water supply.

Although the grounds of these decisions have not been explicitly stated, they are presumably, that the use of the water for manufacturing purposes had become a vested right, and that the use of it for the supply of a city or town was not such a use as might, with propriety, be made by an individual riparian owner.

Deterioration of Seed by Irrigation. — The testimony of all careful observers, in districts where irrigation is largely practised, is to the effect that very abundant irrigation accelerates the germination and growth of plants, but retards the maturity of seeds; and that, where an excess of water is supplied, the texture of all vegetables and fruits, as well as their flavor, is thereby greatly impaired, besides being rendered much more liable to decay. Dryness is essential to the development of flowers and seed. The deduction from this will be that the best seed can hardly be pro-

duced upon lands that require constant irrigation. The finest flavored fruits are always obtained without irrigation, even in those districts where the practice is rendered necessary for ordinary field crops. Furthermore, it has been observed that where choice seeds have been used in well-watered Italian gardens, although the first crop was of a satisfactory quality, yet the stock rapidly deteriorated in the following years and fresh seed had to be obtained.

Irrigated wheat has a thicker skin and consequently more bran than that raised without irrigation; the color of the flour is slightly darker, but it is otherwise of equal quality. The straw of all cereals has been noted as being rendered tougher by irrigation, and the threshing is somewhat more difficult, owing to the adhesion of the grain to the husk.

Sanitary Effects of Irrigation. — There is no doubt that irrigation, as practised in many localities, has the effect to increase and aggravate all forms of malarial diseases; but this fact should not cause us to summarily condemn the practice without examination.

Upon inquiry it will be found that in those districts where irrigating canals have been principally introduced for fostering the growth of rice, hemp, sugar-cane and forage plants, the natural unhealthfulness of the lands, attendant upon the ordinary growth of the crop, is aggravated by the great amount of water that is used by heedless and slovenly management and by the consequent increase of moisture, with corresponding reduction of the temperature of the atmosphere through excessive evaporation.

In one instance which was observed, the amount of water poured over a field of grass averaged more than 3 feet and 6 inches in depth for every day during the entire year. Thus in each 24 hours an amount of water equal to or greater than the whole rainfall of a year, was flooded over the land. It must be expected, as a matter of course, that such a practice, regularly continued, would render any locality unhealthy. But when a sufficient amount of moisture is applied to meet the requirements of vegetation, and no more, and where proper arrangements are made that any excess shall speedily be conducted away by proper drains, instead of gathering in stagnant pools, then and there irrigation will not be found to render the locality at all unwholesome.

In almost all districts where irrigation is extensively used, the extreme abundance and cheapness of the water induces extrava-

gance and wastefulness in its use. Moreover, water is there used to promote the cultivation largely of those crops which, when grown in the more natural way, are of all others the most noted for their unhealthfulness.

In Italy, as well as India, rice and hemp are largely cultivated in this way; in those districts of Spain where water has to be husbanded with care, some crops having to be cut off altogether and left to suffer, hemp is the last thing to be cut off.

SUMMARY.— It is very evident from common experience that injurious droughts are increasing in frequency, and the careful consideration of the subject will develop the following simple but significant truths:—

That whatever may be the cause of this deficiency of moisture, whether it be from the destruction of the forests or not, the simplest and cheapest remedy at the hands of the agriculturist is in irrigation.

That, whenever a supply of water can be obtained, the cost of pumping it will not exceed 3 cents per 1,000 gallons, for an amount of 10,000 gallons per day, pumped to a height of fifty feet above the surface of supply; this cost will include interest on the cost of the fixtures and reservoir, necessary repairs and depreciation; being moreover less than $\frac{1}{3}$ the price charged by the city of Boston for metered water, and considerably less than the price charged for irrigation anywhere that the present generation has constructed the works, and seeks to make them pay a remunerative income.

That, should a brook or spring be not available, there are few places where an adequate supply may not be obtained by sinking wells.

That the cost and arrangement of the works will vary so much with different locations and circumstances that no schedule of cost can be given, but the cases will be rare where $750 to $1,000, discreetly expended, will not furnish ample water for the irrigation of fifteen acres of tillage land.

That the preservation of a single crop in a year of unusual drouth would reimburse the whole expense.

That the positive assurance of immunity from the effects of drouth should induce all cultivators to secure at once the means of irrigating their lands, if possible.

That, besides the security afforded in the case of an excessive drouth, it will be found that water can be used very profitably, in almost any season, with a great variety of crops; and, lastly, —

That the great wonder is that our farmers and horticulturists have disregarded this matter for so long a time.

DISCUSSION.

Hon. Marshall P. Wilder thought that the essayist had not used too strong language in speaking of the importance of irrigation. It cannot be overstated. With it we are sure of success in droughts, and without it we are sure of failure. It is especially important for strawberries, which are sometimes almost destroyed by drought. We cannot control the clouds, but we can control water. Col. Wilson's elaborate paper is of great historical interest. Mr. Wilder introduced to the meeting —

William C. Barry, of Rochester, N.Y., who, after thanking the meeting for their kind reception of him, said that we have been growing fruits and flowers so easily hitherto without irrigation that little attention has been given to the subject, but we shall soon need to practise watering. He had seen irrigation in Europe, and by means of it we can effect wonderful improvements in strawberries. The subject is prolific and intensely interesting.

Warren Heustis said that by practical experience he had found irrigation exceedingly profitable in the culture of flowers. He uses a windmill, which paid for itself the first year.

W. W. Rawson thought the expense of irrigating would be more than was estimated by the essayist. The speaker estimated the cost of applying 2 inches of water to an acre of land at $20, when raised by a steam-pump and distributed either by hose or iron pipes. It required two days' and two nights' labor. He prefers a horizontal boiler to an upright one; he has a 10-horse-power engine and a 2½-inch pump. The pump must be moved, and a movable boiler, engine, and pump would cost about $1,000, and he knows that it would pay in every such season as the last. He agreed with the essayist in regard to the capacity of windmills. The essayist said that water was needed only from April to August, but for the last three or four years he had found it most useful in September. The crops which he watered were cauliflowers, celery, cucumbers, lettuce, and others. He has two windmills, — one with three tanks, and one with one tank, — which are excellent when there is wind enough to carry them. He is getting up a pump to carry round his grounds with two horses, which will pump 50,000 gallons per day. It will require 1,000 pounds of coal and four men, at a total expense of about $20, in-

cluding two horses part of the time. Water must be carried to the highest point on the land. The vegetables grown by the aid of irrigation are not of better quality than those grown in a wet season without irrigation, but they sell better than if grown in a dry season without watering.

Mr. Wilder thought that the best kind of celery would become pipy with rank growth from excessive wet.

Mr. Rawson thought that the Boston Market celery never became hollow. Celery will not grow well in too wet land, but it does not become hollow. It should be grown in well-drained land.

Mr. Barry said that in the last season, which was cool and wet at Rochester, trees grew only eighteen inches, when they should have grown three or four feet. Celery failed, for the same reason, though they had had it remarkably fine in previous years. The case was the same with gooseberries and other small fruits. Layers made small growth, though the land was all tile-drained.

Mr. Rawson said that celery grows best in cool nights.

Col. Wilson said that water from a clay-pit would be no better than any other except for sandy land. We should avoid getting it too roily, for we do not want merely clayey sediment. What is wanted is enough water to make up the deficiency of rain. The last four years have been the driest known, and we needed to make good the deficiency. He had aimed to show that irrigation is an old thing, and a good thing to-day.

John Fillebrown said that some years ago he laid a 3-inch pipe 100 rods, and pumped from Mystic river, forcing the water 2,200 feet, and getting a stream from a $\frac{1}{8}$-inch pipe which afforded 100 gallons a minute. The water was somewhat brackish, but he used it on various crops with success. Afterwards the town works supplied him, and he neglected his own pump; but the town cut him off, and now he is putting in pipes and will soon have a supply of his own. He has used tide-water with success on cabbages, celery, horseradish, and onions. At one time he applied Mystic water to a field of green tomatoes at the rate of one hundred gallons per minute, and had a good crop. When the ground was dry, it was white with salt. He thought that irrigation pays.

William H. Badlam said that Mr. Rawson's point appeared to be that his water cost too much. The expense of raising water 20 feet is about double than that of raising it 10 feet.

Mr. Rawson said that the difference would be only in the amount of coal used; the cost of attendance would be the same.

Mr. Fillebrown said that he found no difficulty in forcing water through his pipes horizontally. The expense of raising it vertically is about one-third more than forcing it horizontally.

Col. Wilson said that a 3-inch pipe is the proper thing, if an iron pipe is to be used. The friction would not be as great in proportion as with a smaller pipe. Friction is a burden to the pump. Second-hand hose from the fire department would answer. He would put on as warm water as he could get, but would put on cold well-water rather than none, though not upon the leaves of plants. Water in a reservoir would be at a temperature of 85° or 90°. The choice might be between the plants parching and using cold water.

Notice was given that at the next meeting the subject would be "The Culture of Dandelions, Asparagus, Spinach, and Brussels Sprouts," to be opened by William D. Philbrick.

BUSINESS MEETING.

SATURDAY, February 23, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

Hon. Marshall P. Wilder, Chairman of the Committee appointed at the meeting on the 29th of December, 1883, to prepare a memorial of Dr. Louis Édouard Berckmans, reported the following:—

The Committee appointed to submit resolutions on the death of Dr. Louis Édouard Berckmans, a Corresponding Member of this Society, report the following:—

Resolved, That in the death of Dr. Louis Édouard Berckmans, a Corresponding Member of the Massachusetts Horticultural Society, we have to deplore the loss of one of the most distinguished pomologists of our age, — the pupil of Van Mons, the co-laborer with Esperen, Bivort, and other savants of Europe, and the father of our associate, the Hon. Prosper J. Berckmans, President of the Georgia Horticultural Society.

Resolved, That in the character of Dr. Berckmans we recognize his varied and valuable services in the production of new fruits and the delineation and description of those most worthy of cultivation in our own land, and we gratefully record our apprecia-

tion of these services. Especially would we remember him as the friend of this Society, the lover of the fine arts and rural life, and as a benefactor to the pomology of the world.

Resolved, That these proceedings be entered on our records, and that a copy be sent to his son in Georgia.

Mr. Wilder added that Mr. Berckmans was a distinguished man in the land of his birth. From his early days he was a lover of fruit culture, and of rural life. He was a man of immense zeal in the culture of fruit and in the promotion of pomology, and originated many new fruits. He brought to this country the residue of Dr. Van Mons's collection of seedling fruit trees, including scions from trees of the eighth generation, and planted more than ten thousand of them at Plainfield, New Jersey. Not many among these have, however, proved of distinguished excellence. He made other extensive plantings at the place mentioned, but circumstances forced him to Augusta, Ga., where he established the nursery now carried on by his son, Hon. Prosper J. Berckmans, also a Corresponding Member of this Society. Here he made an annual visit to the mountains of Georgia, and afterwards planted an orchard in a secluded place at Rome, in the mountain region of that State. He was a most exquisite painter of fruits, and made a collection of paintings of many varieties, with the foliage. He not only effected much for pomology himself, but did a great deal by exciting others to the same good work.

Robert Manning was called on, and spoke of the great variety of Van Mons's seedling fruits received by his father many years ago, when voyages were so long and the means of communication so infrequent that Belgium was much farther away than now, and Dr. Van Mons seemed hardly more than a mythical character. But when Mr. Berckmans came to this country, — a man who had been intimate with Van Mons, Esperen, and other Belgian pomologists, and was familiar with the history of all the new Belgian fruits raised by Van Mons, or collected by him, — the information he imparted to us threw a great deal of light on what had before been obscure and uncertain, and seemed to give reality to what had previously appeared dim and unreal.

The resolutions were unanimously passed.

Adjourned to Saturday, March 1.

MEETING FOR DISCUSSION.

THE DANDELION; ITS POSITION AS A VEGETABLE, ITS VARIETIES, AND THEIR QUALITIES. THE CULTURE OF ASPARAGUS, SPINACH, AND BRUSSELS SPROUTS.

William D. Philbrick had been appointed to lead the discussion, and said that the Dandelion holds the first rank in the list of spring greens. Its earliness, the mild and pleasant bitterness of its flavor, its healthfulness as an article of food, the ease with which it is grown, and the certainty with which it produces a crop in our changeable climate combine to give it a first place in favor both with marketmen and consumers.

It is only recently that the dandelion has been much cultivated, and when the attempt was first made it caused considerable merriment. The first man who cultivated for Boston market was Deacon Corey, of Brookline, who began about 1836. The marketmen of that time used to call them "Deacon Corey's grafted dandelions." Now they are grown by the acre. The seed was at first obtained by selecting the largest of the wild dandelions; lately, however, the French dandelion has been generally used, being larger, and since its introduction it has been much improved in color and appearance.

The dandelion is always treated as an annual by the gardeners, who plough under the old roots as soon as the crop is taken, and use the land for melons or squashes, for the crop produced from old roots is much inferior to what is grown from young ones. The land suited to the crop is any good garden soil; sandy land will bring them early, but strong, rich land will bring a heavier crop. It is a gross feeder, and will take a large quantity of manure. It is desirable to have two pieces, one early, the other late, for late ones are often the most profitable, after the glut is over. They may be planted on a warm slope for an early crop, and on a cooler exposure for a later, or under the shade of apple trees for still later.

A good deal depends on the proper preparation of the soil for dandelions, for the seed is very small and delicate; if sown deeply it will fail to germinate, and if sown near the surface it will sometimes fail in dry weather. For this reason it should be sown as early as possible, and the land should be made very fine by fre-

quent rolling and ploughing. It is also very important to have good fresh seed; and many gardeners raise it themselves. In the field the cutting begins in April, before the plants are half-grown, as they bring a better price then; early in May they come in so freely as hardly to pay for marketing.

The dandelion is very easily forced under glass. The roots may be transplanted in September or October to a cold-frame, and set quite thickly. The glass can be put on in January, which will give a crop about the middle of March, when the glass can be placed upon another bed, and they will come before those grown out of doors. If it is desired to have dandelions in February they can be grown in a greenhouse by transplanting the roots; but they seldom produce so heavy a crop thus as can be grown in cold-frames.

The best land for Asparagus is a deep, sandy loam, free from stones or lumps, which cause the young tender shoots to come up crooked. The land is prepared by ploughing deeply and working in a heavy dressing of manure. It is then harrowed, and thrown into ridges four feet apart, with a large plough going three or four times in the same furrow. The furrow is then cleaned out with a shovel, and the plants are set a foot apart, with a little fine manure around them, in the bottom of the furrow. The object of this deep planting is to get the roots down so that a small plough can be run over them to kill weeds without injury to the crop. The third year from setting it will bear cutting. It should never be cut after the 20th of June, unless the market is very brisk, as late cutting injures it.

The bed should be manured every year; if this is done in the spring the manure should be fine and free from lumps; in the fall, lumps are of no consequence. The manure is spread and ploughed in, or worked in with a disc harrow. The land is worked again, after cutting is over, with a harrow or plough, and with a cultivator as the crop appears above ground. In early spring, or in autumn, before manuring, the tops are cut off and burned.

The plants extend in one direction, and it is important that they should be so placed that this shall be in the direction of the row; otherwise the row will spread out and become irregular. The chief difficulty with an old bed is that it becomes unprofitable by reason of spreading and crowding. It is not advisable to cut a bed more than ten or twelve years; after that time, it would pay better to plough it up and plant anew. The deeper the soil is worked the better; but for market it would not pay to trench it

deeply with the spade, though it might for amateurs, but the plough should be run twice in the same furrow, so as to stir the ground as deeply as possible. The speaker had used only horse manure and night-soil for asparagus. The horse manure is worked into the ground in the fall, and it will reach the roots some time. The night-soil is applied in summer after cutting has ceased. The plants will take any quantity of manure. If he were away from the city, where stable manure could not be obtained, he would try chemical fertilizers.

There is some difference of opinion among cultivators as to how much has been effected in the way of improving asparagus, by Messrs. Conover, Moore, and others. When Conover's Colossal was sent out, the speaker procured plants, which did not prove different from the common kind. He thought Mr. Moore had been more successful. In every field some plants will be found which throw up larger stalks than the majority; and Mr. Moore dug these up, and planted them by themselves, where they would be fertilized only by each other.

Spinach will rank as second in importance only to dandelions. It is found in the market nearly the whole year. There are two varieties, the spring and winter, the difference being like the difference between spring and winter rye or wheat. Spring spinach is sown as early as the land can be prepared in spring, and is much used as a "catch crop" between dandelions, onions, beets, horseradish, parsnips, or any other vegetables that are slow to start. The spinach can be cut in five or six weeks, and does little harm to the late crop. There is some demand for spinach during the summer, and, for the purpose of supplying this demand, seed is sown every ten days. The growth in summer, however, is apt to be small in dry weather, and the leaves are often infested by a maggot so as to be of little value, and the speaker has nearly given up its cultivation during summer. For fall and winter sale the seed is sown at any convenient time from the middle of August to the first of October. The portion sown in August is usually cut up in the fall for sale, or for storage in suitable pits; or it may be cut at any time in winter when the frost is out of the ground for an inch in depth. It will keep well in any pit when the temperature is not too high or changeable; a little frost will make it keep better if it continues frozen. It used to be the custom to house spinach. After cutting it up as late as possible in the fall, it was put in a well-ventilated cellar, on shelves about a foot apart, and six inches deep on the

shelves. It may also be kept in a frame or a pit, like celery. The great point is a low and uniform temperature.

The portion of the crop sown in September is commonly wintered in the field, and cut very early in the spring. It usually keeps better if lightly covered with salt-water sedge, or other similar covering, — just enough to shield it from the rays of the sun. This portion of the crop supplies the market in March and April, and until the spring-sown crop is large enough to cut. The market in winter and March is largely supplied from Norfolk, Va., where it is grown very largely, and can be grown cheaper than here.

Artificial fertilizers are excellent for spinach; sulphate of ammonia, or some other strong nitrogenous manure, may be applied as soon as the frost is out of the ground, and will cause a rapid growth. Much of the fall spinach did not come up last year until October, on account of the drought, and the speaker thought it would pay well to irrigate under such circumstances.

Brussels Sprouts have not been much grown here for market, indeed, Mr. Philbrick knew but one man who had grown them for market, and that only within a few years. They are a variety of cabbage, sending up a stem two or three feet high, with a tuft of large leaves at the top, and on the stalk buds like little cabbages, about as large as a walnut with the outer shell. These are the portion eaten, and are very delicate. They are grown exactly like fall cabbages or cauliflowers, sowing the seed late in May, transplanting in July, and harvesting in the fall, or placing them in pits like celery pits, for winter use. There is a limited demand for the sprouts at five or ten dollars per bushel, but the crop is a very uncertain one, often failing entirely in dry seasons. There are two varieties, the tall one being preferred. They are cooked and used just like cauliflowers.

Samuel Hartwell said that he has a bed of asparagus, of an acre and a quarter, which yielded four hundred dollars after paying commissions. He usually manures in spring, though fall might be preferable; but the spring is more convenient because he collects most of his manure in the winter. It will take all the manure you can afford, and the finer it is the better. The bed can only be ploughed shallow, on account of the danger of injuring the roots. He ploughs as early as the weather will permit, and harrows a week or fortnight later, and, as late as possible without injuring the shoots, goes over it with a bush harrow or leveller, to make the soil fine. He cuts from about the 20th of May to the 20th of June,

though some cut until the 4th of July. The time depends somewhat on how it sells; but too late cutting will injure the roots. In an old bed the rows spread and make more work hand weeding.

He weeds only once before ceasing to cut, and then goes over the bed with a Shares harrow. His bed was originally prepared with a common plough. He does not like to have seedling plants come up between the rows, but sees no effectual way to prevent it. Seed-bearing exhausts the ground, just as cucumbers allowed to go to seed exhaust the ground more than if cut for pickles. He used three or four barrels of fish salt on his bed, but could not say that it did any good.

William H. Hunt had raised dandelions under glass in a small way, and found it profitable. To be profitable they must be got into market when they bring a good price. The question of profit in regard to any crop may depend on the distance from market, and he is a little too far from market to compete with nearer farms or a dull market, especially in dandelions. Asparagus being less bulky than most crops, and requiring a good deal of land is well adapted to farms distant from market. Moreover, only one crop can be raised in a season; and near Boston, where land is valuable, it must be devoted to such plants as will admit of two crops. At Concord land is cheaper, and there is much light soil, unsuitable for grass, but adapted to asparagus, and consequently it is extensively grown there, some cultivators having as much as eight or ten acres, and finding it a profitable crop. The rent of the land is not counted at all. He would plough as deeply as possible; if the plough can be got down deep enough there is no necessity for using the spade.

The rows are placed four feet apart, and the plants from eighteen inches to two feet apart in the row. If a crop is wanted quickly they are set nearer; but the bed would not then last so long. There is no insect enemy of any account; the speaker had never seen the asparagus beetle, which is troublesome in some places. The crop is never very profitable, but, on the other hand, total failure is never known, though there is considerable difference in different seasons. In a warm season the time for cutting would be shorter than in a cooler one. The receipts are three hundred dollars, or more, per acre, somewhat in proportion to the quantity of manure applied, which is generally from eight to ten cords. Some fertilizers are used; phosphates or nitrate of soda, or a mixture of them, may be applied once in three years. He had used

saltpetre waste from a powder factory, which contained a small amount of nitrogen. There is a difference of opinion in regard to the use of salt; the speaker thought that the same amount of money put into manure would do more good than if expended for salt. He did not know why asparagus could not be improved by selection, and believed it would be just as advantageous as with any crop. He thought that Mr. Moore had succeeded in improving it. Mr. Moore usually sorts his asparagus into two grades. The speaker could not say that the larger is any better than the smaller, but it brings a better price.

Benjamin G. Smith said that he has a bed fifty or sixty feet square, made thirty-three years ago, and then trenched from thirty to thirty-six inches deep, and it has never failed to furnish a supply for his family. He applies three inches of barn-yard manure annually, and salt to destroy weeds, and the bed is as good as when he bought the place twenty-eight years ago.

Hon. Marshall P. Wilder said that the discussion had established three things,— that an asparagus bed may be made to last twenty or thirty years; that the plants are never infested with insects here; and that the crop never fails. He did not believe expensive preparation of the bed by deep trenching to be good economy; it has been pretty well established that annual applications of manure are sufficient. The great secret in applying manure is to have it well decomposed and near the surface.

Mr. Philbrick said that in the market in New York city he saw two kinds of asparagus,— one white, except an inch at the top; the other like that grown here. The former is grown by running a plough between the rows, and throwing up ridges over them as soon as the shoots begin to appear. It is cut by thrusting a long knife into the ridges, which must be done two or three times a day. It brings double the price of the common.

Mr. Wilder said that the French get monstrous white asparagus by piling manure around the plants, adding more as the plants grow.

Mr. Hunt said that the asparagus which he saw in France was mostly white.

Mr. Wilder said that he cuts his asparagus even with the ground, instead of cutting an uneatable white piece several inches in length below the surface.

President Hayes spoke of eating most delicious white asparagus at the table of a gentleman who got it from Germany canned. He

raises a good many Brussels sprouts, and keeps them in a frame or pit until midwinter. They were not yet gone at the time of speaking. They are very delicious, and he is surprised that they are not more grown.

Mr. Hartwell said that large asparagus is not more than half as much work to cut and pack as small. He does not think the white asparagus as good as the green.

Mr. Wilder said that the late Samuel Walker would have corroborated Mr. Philbrick's view that there is only one variety of asparagus. The speaker believed with Mr. Walker that the reason some is larger than others is that it has more food.

The subject for the next Saturday was announced to be "Seed Growing as a Branch of Market Gardening," to be opened by W. W. Rawson.

BUSINESS MEETING.

SATURDAY, March 1, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

Mrs. T. L. NELSON, of Worcester,
having been recommended by the Executive Committee, was, on ballot, duly elected a member of the Society.

Adjourned to Saturday, March 8.

MEETING FOR DISCUSSION.

SEED GROWING AS A BRANCH OF MARKET GARDENING.

By WARREN W. RAWSON, Arlington.

As this subject is not a very broad one, but only a branch of another, I will not undertake to describe to you the business of seed growing or of market gardening, but will mention some of the peculiarities of seeds in connection with market gardening. It will be taken for granted that a market gardener must be a seed grower to some extent, because he cannot wholly depend on buying all of his seeds, and must raise the principal part of them.

In raising seeds the best is selected and left to mature, and the

remainder of the crop is sold. In this way only the first or second setting of the fruit is used by the grower, they generally being the best; but this is not the way most of the seeds are grown at the present day. Those who make a business of seed growing save the whole crop, and sell the seed; but it is not so with the market gardeners, for, as I have before said, the best only is selected by them. In this way we can make some calculations what our crop will be, as far as the seeds are concerned. It is not the practice of breeders to keep the whole of their stock for breeding purposes, either of cattle, horses, or swine; and the same rule will apply to seed growing. If the best were sold the stock would gradually run down; but the greatest care is taken in the selection of animals; and it is just as important that seeds should be managed in the same way.

The mixing of seed is a very important point in the management of seed growing, because every kind of the same nature will mix more or less if not kept at a proper distance from each other. This mixing is done by bees, and also by the wind. Two different kinds of squashes, tomatoes, cucumbers, beets, cabbages, or, in fact, any of the different vegetables of the same nature, will mix, and seed saved from them will not be pure.

But, while it is sometimes a disadvantage to have the seed mixed, in other cases it is a great benefit, because in this way many of our new kinds of vegetables are produced. In the business of market gardening the bee is a very useful insect not merely in the mixing of the seeds; in the growing of cucumbers it is almost indispensable. Those who grow cucumbers to any extent always have a number of swarms of bees; and in hot-houses you will always find them.

I have thought that about one mile apart was the proper distance to put seeds to be sure that they will not mix. Perhaps many of you have noticed that a seed grower almost always has two or more farms; and this is the reason. We are very favorably located in one respect for growing seeds, being farther north than most of the land where the larger part of the crops of the country is grown; and the call for northern seeds is always noticeable, because our seed taken south will do as well, if not better, where the weather is warmer and the season longer, than at home; but to bring them from the south to the north will not answer, the season being shorter and the weather cooler.

Another point is the age of seed. Some seeds are good only

one year; we will except them, and say that all that are good for more than one year are better the second year, or perhaps when four or five years old. This is the case with most all vines, especially cucumber and squash. They will make less vine and more fruit from old seed than from new. Many do not believe this, and that is the very reason that I speak of it, for I know it from experience. Cabbages, also, will head up better from seed two or three years old than from new seed.

The Danvers onion is a very popular variety, and great care must be taken to keep the onions of the proper shape, which is quite round; but, when carried to a different climate, it has a tendency to grow flat, and it is inclined to do so here, but, by selecting the onions that are perfectly shaped, the seed is kept true. So I might go on and mention something about nearly every kind of seed used by the market gardeners, but I will not take the time to do so now, having mentioned some of the principal ones, and wishing to give others who are here time to speak, as many of them are much older and more experienced than myself.

The business of market gardening is at the present time quite extensively carried on; and so is the growing of seeds. The cares of one are somewhat similar to those of the other, and they can very easily be carried on together. Very few have attempted it, but I have made a beginning, and expect to make seed growing one of the principal branches of market gardening, and, I hope, one of the most profitable. The call for good seeds to-day is greater than ever, and I think that the prospect for a good, careful seed grower, is as good as in any branch of business that can be entered into.

In closing I will say that what I have stated has been my experience for the past twenty years, and I shall continue to follow out the lessons I have been taught,— although experience is sometimes a very dear teacher, — and continue selecting my seeds with the greatest of care because, by so doing, I shall be more successful as a market gardener, and also more reliable as a seed grower.

Discussion.

Hon. James J. H. Gregory was called on as an extensive seed grower, and said that good seed is of the first importance; it is at the bottom of all good farming. However well the ground may be manured and prepared, if the seed is poor there can be no success. The seed business should be carried on conscientiously: a

great responsibility rests on both grower and dealer to furnish only good seed. The farmer trusts his hope of a crop to the seedsman, and he who knowingly betrays his trust is an unworthy steward. Mistakes, however, will often occur at both ends; the seedsman is deceived in buying his supplies; the grower is sometimes disappointed by unfavorable seasons; and the farmer makes mistakes in planting too early or too late, or too deep or not deep enough, and lays the blame on the seed, when it belongs on his own shoulders.

Seed growing is not what it used to be, when the grower was unknown, and the farmer came in contact only with the retailer. The grower must be wide awake in regard to the introduction of new varieties. There is much want of judgment on this point; but it is the over-sanguine man who goes ahead and introduces vegetables that are new simply because they are such, without first having tested them to determine whether they are in any respects superior to sorts already established. If we threw away all that seedsmen have introduced we should lose a great deal. All the new potatoes, beginning with the Early Rose, have been introduced by seedsmen. The Hubbard Squash had been known in Marblehead for forty years, but nowhere else until the speaker disseminated it. When he first carried them to Boston market he was told that he could not sell them; but by giving them away he made the public aware of their excellent qualities. Besides selling seeds and introducing new varieties, another office of the seed grower is to test the new kinds offered. Sixty varieties of beans, thirty or forty of corn, and other vegetables in proportion, numbering hundreds in all, make up the annual tests in the trial grounds of any enterprising seedsman, and out of all these he is fortunate if conscience and experience allow him to send out half a dozen varieties as acquisitions to our vegetable gardens. An honest man will not send out poor things. It may sometimes be well for gardeners to raise seed; and the market gardeners around Boston have by selection got improved strains of many vegetables, but seed growing is an art which most gardeners cannot attend to. There are many difficulties in the way: the English sparrow is a nuisance of recent importation; many seeds ripen irregularly and must be carefully watched; some seeds do much better on certain soils than on others; for instance, onion seed grown on strong clay soil is heavier, and a larger proportion will vegetate, than if grown on light soil. The crop last year was the same from light as from heavy soils.

Market gardeners know that the quality of seed depends on careful selection of the stock from which it is raised. The old way was to plant the whole crop of cabbages, beets, onions, etc.; and the speaker had seen thousands of pounds of onion seed raised from small bulbs, whereas first-class stock only should be used. In a bad season for cabbages you cannot get a good crop, even from the best seed; but it will be poor, and of irregular appearance. The seedsman should be criticised fairly. It is well for seed buyers to count a small quantity of seed and see what proportion vegetates. Onion seed is tested by sinking it in water, or by winnowing; but this is not a certain test, for old seed may sink and yet be worthless. There is sometimes more than one normal form to vegetables, but they are sometimes criticised as if there was only one standard; in the Wakefield Cabbage, for instance, the conical and the flat forms are both normal. The tendency of improved vegetables is always to revert to the original type.

The handling of seed stock is a very important matter. Onions should be kept in a cool cellar, as near freezing as possible, and not in a mass, but in crates. To keep cabbages for seed the speaker would plough three furrows, and plant the cabbages in them in November, throwing on earth to the depth of from four to six inches, allowing this to freeze, and then covering with eel-grass or other litter so deeply that the ground will keep frozen down to the cabbages until spring. Beets and carrots are kept in pits; but those for carrots should be near the surface, as they tend to heat and rot. The onions are planted first in spring; then the cabbages, and then the beets. In cabbages the vital point is at the tip of the stump. If the heads are very solid they are sometimes cut across, to allow the young shoots to push out. The culture is the same as for other crops. Seed crops are generally harvested when two-thirds of the crop is ripe. Some are gathered in sails, and the seed is beaten out on them; others are teamed to the barn and threshed there. Some seeds, such as beets and carrots, require two or three cuttings. Cabbage and onion seed may be threshed by machines; but machine threshing breaks up the stalks of beets too much. Squashes should be stored and the seed taken out as they begin to decay, and the eatable portion marketed or fed to stock; and this is worth enough to pay for handling the seed. If packed in barrels, before it is sufficiently dry, squash seed will cake together. It should be so dry before it is packed away that it cannot be bent, but snaps.

William D. Philbrick said that he had raised only few varieties of seed, which he was unable to buy. As a general thing he preferred to buy seed, because it is a great deal of trouble to raise it. The chief difficulty in the seed business lies in the ignorance of the public, and their unwillingness to pay for really good seed what it is worth. The best seed of some sorts never sells for what it costs to grow it and therefore is seldom offered for sale. It is to be hoped that in the future a more discriminating demand will arise, and that really valuable seed will sell for what it is worth. The seedsman who has the name of furnishing such seed will, in time, be appreciated, for it is a business in which a good name is worth more than money. A farmer can well afford to pay ten times the common price for seed that is carefully grown rather than accept an inferior article free.

Mr. Rawson, in reply to an inquiry, mentioned beet, parsnip, onion, and dandelion seed as among those that must be used fresh, while cucumber and squash seeds are better when old. Cauliflower seed is one of the hardest to grow; he would rather pay fifty dollars a pound for it than to raise it.

P. B. Hovey said that people want to buy seeds cheap and the seedsmen have to cater for them. He agreed with what had been said about squash, cucumber, and melon seed being better when old; and it has been said that in England the effect of age has been produced by carrying the seed in the vest pocket. These seeds are undoubtedly better when from two to four years old than when fresh, and will grow at ten years. Most seeds are good when from two to five years old. Parsnip seed is not considered reliable after the first year, but the experience of the speaker is that it is good the second year if kept dry. Dandelion seed is better new, but endive is good for four or five years. Cabbage seed is good when three years old. Cauliflower seed is not so easily raised here as in France or England, but it can be got for half the price mentioned by Mr. Rawson.

Charles M. Hovey said that, while the members of the Society appreciate the importance of good seed, the public, generally, think that a seed is a seed, and one seed is as good as another. There are now sixty varieties of peas, and three or four are added every year, but many of the kinds offered as new are only fixed up by selection from old varieties. All improved seeds will run out unless kept up by careful selection. Carter's Extra Early, Dan O'Rourke, and other early peas are so much alike that it is not

worth while to grow more than one of them. If the seed is not carefully selected they will grow from three to five feet high, and be untrue to their kind. The superiority of old cucumber seed to new can be explained on scientific principles: when fresh they are fleshy, and contain pabulum which gives vigor to the young plant; but with age they get rid of the surplus food. Cucumbers and melons from old seed fruit a great deal better than from new: they are shorter jointed and flower at the third or fourth joint, while if the seed were fresh, they might not until the tenth joint. The seed of tuberous-rooted begonias drops easily, but by gathering it when green it can be saved, and by carrying in the vest pocket for four months it will dry gradually, and get rid of the surplus nourishment, and ripen. He had practised this for ten years. Many delicate seeds can be ripened in this way, and thereby get somewhat of the character imparted by age. The difficulty in raising cauliflower seed here is in keeping the plants over winter, and, on this account, it can be raised better in Europe, though they are sometimes killed there. Mr. Rawson is right in the belief that one whose time is valuable, and who has other things to attend to, would do better to leave the raising of seeds to those who make a business of it, rather than to attempt it himself. The speaker had tested seeds for many years, and at this time had a large number of pots under trial. Most seeds are not reliable when over one year old. Beet and parsnip seed will come when older, but he would rather have them fresh; they will come if the season is favorable, when they might not otherwise. Onion seed depends much on the manner of curing. Peas and some other large seeds will keep more than one year, but most seeds are not reliable more than one year. Oily seeds, like those of the Cucurbitaceæ, will keep ten years, and then be as good, if not better, than when fresh.

Mr. Gregory said that he had planted seed of the Symonds beet eight years old, and almost every seed grew. But there is a limit to the vitality of seed, and the question is, Where is the danger point? To test seed of the squash family, snap them in two, and, if they look dark and rancid, they will not grow, but if white they are good. He had enormous heads with only four leaves, of the Extra Early Erfurt cauliflower, from five hundred of which he got only a teaspoonful of seed; and another grower had the same experience; but in two succeeding years he got forty pounds from the same number of plants. Some plants insist on bearing seed and some refuse.

Mr. Rawson said that he sowed his cauliflower seed in December, and let the good ones go to seed when he could get fifty or sixty cents each for the heads. He got a quarter of a pound of seed from cauliflowers that would have brought fifty dollars. Some will yield a great quantity, but not of any value. Henderson's Improved Snowball is the best variety.

Hon. Marshall P. Wilder thought the subject under discussion one of the most important that had ever engaged the attention of the Society. Good seed lies at the foundation of all success in gardening. He was glad to hear Mr. Gregory speak of the responsibilities of seedsmen. He who sells bad seeds to poor men takes away the means whereby they live. Every vender of seeds should test them under his own supervision, and then he will become a benefactor to the gardener; but if he sells poor seeds he is a curse; for he cannot repay him for the loss of his crops. The speaker thought the responsibility for poor seed should rest on the seller. There are many honorable dealers in this city. Let us impress on dealers the responsibility that rests on them. The best seed is seldom sold, but is retained as the basis of further improvement. Seed growing requires great care and constant and watchful supervision. Mr. Wilder advised experimenting in the production of new varieties by hybridizing, carefully retaining everything until it is fully tested. Hybridizing is an art not generally understood until recently, but one which can be practised by all, and it is the great means of improvement in varieties. Mr. Rawson is right in regard to keeping seeds from intermixture.

Leander Wetherell said that he bought oats at a seed store in Boston, and it proved that mixed with them was charlock seed, which he had taken great pains to get out of his land, and it cost him a great deal to get rid of this second sowing. A neighbor bought clover seed, which proved to have Canada thistle seed mixed with it. He recommended examining seeds with a magnifying glass, to detect such mixtures.

John Fillebrown had sown seed of the yellow flat onion that he knew to be ten years old, and two-thirds of it came up. He sowed beet seed fifteen years old, which came up as well as fresh seed of his own raising.

Mr. Wilder said that if he were a seedsman he would never sell seed until he had tested it by sprouting.

C. M. Hovey said that seedsmen keep clover and other seed of two or three qualities and prices, for some buyers would think the

price of the best too high, and want some at a lower price, so the dealer must keep it. He thought that seedsmen ought not to bear all the blame of failure of seeds. Probably the trouble cannot be overcome until the public is educated to understand that the best seed is the cheapest in the end. They cannot judge of its quality by sight, as they can of a coat or a hat, and must rely on something else.

C. Terry said that a neighbor of his took special pains to get the best onion seed, and after waiting more than long enough for it to germinate, ploughed it up and sowed carrots, with the same result. There was nothing left for him to do but to sow turnips, which fortunately came up, but were of much less value than the onions would have been. Here there was not only loss of money, but of labor, and the use of the ground for the season.

Mr. Gregory mentioned an instance where onion seed sown before dinner vegetated well, but the same seed sown after dinner failed. The only difference was that a slight rain came at dinner-time and injured the ground for sowing. Seed should be kept in an even temperature and not exposed to the air.

C. M. Hovey would not put seed in an air-tight receptacle. A barrel or can is not so good as a bag, which allows a slight access of air.

The Committee on Discussion announced that the subject for the next Saturday would be "The Best Work for Horticultural Societies, and how Best Accomplished," and that the Ex-Presidents of the Society had been invited to take the lead in the discussion.

BUSINESS MEETING.

SATURDAY, March 8, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

No business being brought before the meeting, it adjourned to Saturday, March 15.

MEETING FOR DISCUSSION.

The Best Work for Horticultural Societies and how Best Accomplished.

The Ex-Presidents of the Society had been requested to speak on the subject, and William C. Strong was called on. Mr. Strong said that, in turning the subject over in his mind, a special point had occurred to him. All are agreed that the main work of horticultural societies is to diffuse information by means of exhibitions, the influence of which is felt not only among their own members but among the public generally. It is impossible to over-estimate what has been done by our own Society in this way for the improvement of horticulture all over the country by making known new varieties of fruits, flowers, and vegetables. But the special point to which he desired to call attention is, that it is now time to do a counter work, by warning the public against over-praised novelties. It is important that all good new varieties should be introduced speedily, but an immense injury has been done to horticulture and floriculture by the introduction of new varieties which have been over-praised by their introducers or disseminators. There is a natural craving in mankind for something new, and the catalogues of nurserymen and seedsmen always contain an attractive array of novelties in plants and seeds, few of which are worthy of a permanent place. The case is the same in Europe, but not to the same extent as here, where the evil is stimulated by the readiness to receive new varieties, and the consequence is frequent disappointment to cultivators. The speaker thought we ought however to be progressive, and not too conservative, but should encourage the production of good new varieties.

A proposition was lately made by an enterprising nurseryman, to offer prizes, to be awarded by this Society, for certain new things which he is sending out, and some thought it an opportunity which should not be neglected, to secure the exhibition of these novelties without indorsing them; but the speaker was of the opinion that it would have been impossible to accept the offer without indorsing the articles to a certain extent. The acceptance by the Society of such an offer would almost inevitably have created the necessity on the part of growers to purchase the articles, who would then have become interested and would not have been un-

prejudiced. When the Keiffer pear was introduced all nurserymen of any enterprise were forced to procure it, though they may have been doubtful of its value, and now they all have a stock, and it is for their interest to unload, and the result is that it is lauded as one of the most wonderful pears, and recommended far beyond its deserts; in the Northern States, at least.

The committees of the Society have only one duty, — to pass upon the character of the specimens on exhibition, — and are not at liberty to speak of anything further; and nurserymen cannot state in their catalogues every point in regard to the articles offered by them. It is the duty of the Society to protect its members and the public, so far as it can, against the vast amount of humbug abroad in our land. It should also endeavor to keep up with the times, and not neglect to give attention to new things, but should examine them carefully, and award its prizes and medals only to things of real merit.

The discussions held by the Society have been very useful, allowing experienced cultivators to give the results of their experience in a way they cannot do elsewhere. The speaker thought the discussions might be modified to some extent to advantage. He believed in carefully prepared essays, and would make them more brief and pointed, and would confine the discussions more strictly to the subject of the day, so as to have time for other subjects, such as might be suggested by the exhibitions. He was inclined to call on those holding prominent positions in the Society for comment on the articles exhibited, such as the roses shown to-day. Such comment would be of great assistance to the public.

Edward L. Beard, Chairman of the Committee of Arrangements, was called on, and said that eight years ago he knew as little of horticulture as the veriest neophyte, and his experience as a member of the Society was of no longer date. He was impressed with the importance of the Society as an educational institution. The Society should grow stronger as it grows older, and the secret of this is in filling up the ranks with young men. This is not always an easy matter, for in the pursuit of wealth and power the quiet tastes of the horticulturist are forgotten, and they are too frequently lacking in young men, who are more interested in their horses or in other pleasures.

We should foster the efforts of young men in horticulture, and bring the community more in sympathy with our efforts. Many persons admire flowers who are unwilling to go through the drudg-

ery of cultivation; they have not sufficient enthusiasm, and we should strive to increase the practical love of horticulture, and to bring into our exhibitions all who are susceptible to their influence. If a person has grown a flower or fruit successfully he almost always acquires an interest in horticulture, and the love grows upon him. The speaker thought the Society had taken a forward step in reducing the price of admission to the coming spring exhibition, and he believed that the result will be that many who have heretofore stayed away will now come. If the Society were strong enough, he would favor free admission to the exhibitions at certain hours for poor children.

John B. Moore said that the Society should be in every sense an educational institution; the exhibitions, the discussions, the publications, and the library, should all be directed to this end. By its sympathy with other institutions of similar nature it should strive to create a taste for horticulture. Many of our most eminent men and noblest patriots took more delight and pride in their farms than in public life, and have desired to return to rural life from their high stations. Washington, Jefferson, and Webster are instances. Mr. Strong had spoken of the disappointment experienced in importing new plants from Europe; but to a great extent this is unavoidable. The speaker, before sending for new roses and other plants, waits to see what medals or certificates of merit have been awarded to them. This should teach us to be careful in making awards for novelties, and not to cheapen our medals or certificates by too free distribution.

Our TRANSACTIONS will compare favorably with those of other societies. They should contain all the doings of the Society, and should give accounts of all the objects exhibited, and it is exceedingly desirable that the reports of the meetings for discussion should be ready in season to be used the same year. The publications of a horticultural society should not be devoted exclusively or mainly to setting forth the views of the secretary.

William D. Philbrick thought the influence the Society might exert upon children could not be overrated. He agreed with the Chairman of the Committee of Arrangements in regard to admitting children to the exhibitions free, and would go further and offer a special list of premiums for products grown and exhibited by children under fifteen years of age.

John G. Barker was impressed by Mr. Strong's remarks on the introduction of new things. In some cases the committees have

undoubtedly been hasty in awards to novelties, and there are instances of awards in past years to things which, in a short time, went out of existence. A horticultural society should be not only an educator but an indorser. People look to the awards of this Society to see what they shall grow. They come to the exhibitions of this Society from Lynn (where the speaker has his home) and base their purchases on what they see here, and inquire of him about the productions shown here; and the same is doubtless true in regard to visitors from other cities and towns in the vicinity. The TRANSACTIONS of the Society in the Lynn Public Library are much read. We should keep abreast of the times, but we should be careful about giving the indorsement of the Society to productions exhibited.

Mr. Barker wished that more could be done for the promotion of tasteful landscape gardening, and that the Hunnewell prizes, established for this purpose, might oftener be competed for. The Garden Committee also regret that they do not receive more invitations to visit small places, — from an eighth to a quarter of an acre. Sometimes such places are crowded with plants and shrubs almost thicker than they stood in the nursery rows. The speaker feared that this was too often prompted by nurserymen, who want to sell as much of their stock as possible, and do not understand that one good specimen plant will give that variety a better advertisement than half a dozen in a clump. A horticultural society should endeavor to educate both the nurserymen and the estate owners, and enlighten them in regard to true taste. Looked at merely from a pecuniary point of view a small expenditure for the tasteful planting of trees and shrubs, as well as for keeping the house neatly painted, will increase the value of the estate double or treble the cost of such improvements.

The admission of children to the Society's exhibitions was regarded by the speaker as a step in the right direction. He would send tickets to the North-End Mission and Children's Mission. When a boy, his father gave him plants and ground, on condition that they should be well cared for; and the impression made by the condition of the gift will last as long as he lives.

E. H. Hitchings thought we ought to interest ourselves more in the cultivation of native plants, some of which are handsomer than many of the foreign flowers that have been introduced to our gardens, such as the *Cypripedium spectabile*, *C. candidum*, *Calypso borealis*, *Arethusa bulbosa*, *Trillium grandiflorum*, *T. erythrocarpum*, and *Leucothoë racemosa*.

Ex-President Charles M. Hovey was pleased with Mr. Beard's views. The best work of horticultural societies is education in all the branches of cultivating the earth. He embodied his views on this subject in his annual addresses when president. But things have changed since then; the older persons are going out and their places are not filled as rapidly as they should be. Mr. Hovey spoke of the Royal Horticultural Society of London, when such men as Sir Joseph Banks, Thomas Andrew Knight, and Richard Anthony Salisbury were, in a former generation, present at the meetings and contributed papers to the "Transactions," and exhibits were made by the nobility and other wealthy amateurs. Now there is scarcely a single plant from them, but they all come from nurserymen. Somewhat the same change has occurred here. We cannot count such gentlemen as John Lowell, Zebedee Cook, Jr., Samuel Downer, and Samuel G. Perkins among our members: they have turned to other subjects. The Society is still growing, but the speaker would like to see more gentlemen of wealth and leisure interested in it, and a less proportion of those who are engaged in cultivation for a living.

Mr. Hovey alluded to the remarks of the Secretary of the Worcester County Horticultural Society on the replies of some eminent fruit growers, to an inquiry in the "Country Gentleman," as to the six best raspberries. The answers, almost without exception, related the experience of market growers, and entirely ignored such varieties as the Orange, Fastolff, Franconia, Knevett, Hornet, and Northumberland; but we did read of the Souhegan, Gregg, Ohio, Tyler, and Mammoth Cluster, and then "realized that the whole pother had been, after all, only about thimbleberries!" We must not govern ourselves wholly by the consideration of what is best for market, and it should not be the exclusive object of horticultural societies to recommend what will sell best in the market. There is no way in which such societies can accomplish so much as by the offer of liberal premiums, sufficient in amount to be regarded as of value, and to encourage laudable emulation among cultivators. When the speaker became president of the Society, the number of members was six hundred, and the premium list amounted to $1,200; when he retired from office, there were a thousand members, and the premiums amounted to $3,000. Probably the great majority of awards of premiums and certificates are just; but sometimes a just award may be misleading. Visitors to an exhibition may think the roses which take the prizes the best for general

cultivation, — and they are the best for those who can give them the cultivation necessary to bring out their merits; but not all of them are best for those who have not the means to do this. The liberal Prospective Prizes offered by the Society for new seedling fruits have been the means of bringing forward grapes, strawberries, and other fruits, which are now found in every garden. The Keiffer pear is of poor quality, — in New England not above third-rate. Landscape gardening in the vicinity of our large cities is not of as much importance as in past years, and the amount expended on suburban estates is not so much in proportion to other expenditures. A grass-plot is now about all that the average suburban villa owner cares to support. The old style of residence is going out; the tendency is to the city in winter and to the sea-shore in summer; and people do not have the practical taste for horticulture, and do not want the expense of keeping up a country residence.

The speaker thought that money was frittered away in trying to teach botany and the fine arts to children, while spelling was omitted. They might get some benefit from visiting horticultural exhibitions, but he would not carry the plan of admitting them free to any great extent.

Mrs. H. L. T. Wolcott was sorry to see the position of Mr. Hovey, — looking back and mourning over the past. We want the work of the young, and she believed in educating children to a taste for gardening. A few years ago an attempt was made to arouse the Society to its duty to children, to the beneficial effect of which the teachers of Sunday and mission schools, which were engaged in the movement, bore witness. The attempt was renewed last year, but too late in the season. Such a movement should be general, for rich and poor alike, and might reach a child whose father has a greenhouse full of flowers which the child has never been allowed to touch, as was the case in one instance which the speaker related. She hoped that florists and horticulturists would bring flowers and children to the exhibitions. The movement for the benefit of children should be in charge of a committee appointed for the special purpose, and having a warm sympathy with the object. She thought medals and diplomas had been depreciated by being awarded to those who had been out into the fields and gathered wild flowers, and hoped that in future such honors would be reserved for those who really deserved them. The Society's medals should mean something. She believes in the people always.

Mr. Hovey said that he did not object to the admission of children to the exhibitions.

Mr. Beard said that his own children are more delighted with a single plant of their own than with all his. One of his little girls has a calla in the greenhouse which she has taken care of for three years. The love of flowers exists, in every child's heart, as certainly as life; it may be latent, but it is there, and may be aroused to activity. How eagerly they watch the opening bud, and how they clap their hands at the full flower! The Society is confronted by one great difficulty in making its awards, which is the commercial value of flowers. At the time of the spring exhibition, roses command a high price, and it requires great effort and persistency to get cultivators to exhibit them. The committee are sometimes compelled to make certain awards for the sake of keeping up the exhibitions. We cannot always stand on that high ground which we should like to occupy, and judge a thing only on its merits. He hoped the Society would have it in its power to offer more and larger premiums in the future. The receipts from exhibitions were trebled last year, showing an increase of interest, and he believed that we should see more in years to come.

Mr. Strong said that all are agreed that premiums are the foundation of success in a horticultural society. But they are sometimes misleading. A large premium was last year offered by a nurseryman and awarded by this Society for a grape which he was engaged in disseminating, but which the speaker believed to be not worthy of cultivation here. He would have, after the reading of an essay, some brief remarks, and then brief, concise, remarks on such points as our shrewd Vice-President (Mr. Moore) had indicated and would avoid rambling discussions. A certificate of merit needs comment to show just what it means, and people who purchase things that they see have taken prizes will inevitably sometimes be disappointed in them.

President Hayes said that the object of the Society is to do the most for the advancement of horticulture and thereby to benefit the members and the public, and we should thoroughly study and discuss the best means to that end. We should all seek to get the best things, and not reject novelties, but be careful how we recommend them, — we should "prove all things and hold fast that which is good." It seemed to him that in presiding at these meetings it was peculiarly proper for him to elicit information from all, for many of those who possess the most information are often most mod-

est in speaking. The president must have some discretion, and if we lay down any iron rules we shall find them an obstruction to the objects of the meeting. Experience has shown that two hours is not too much to discuss an important subject. He mentioned these points only to show how difficult it is to please all. The Society has been crippled in its means, but it is not meanly hoarding up, and he thought that it might now enlarge its premium list, and at the same time lay up something every year as a sinking-fund for the payment of its debt. It is well to look on the encouraging side, and he thought these meetings had never been so interesting as in the last few years, that the published reports had never conveyed so much information, and that the exhibitions had never been more attractive or instructive. We want the assistance of the Lowells, the Cooks, the Downers, and the Perkinses, and other wealthy amateurs of horticulture, but we want still more the people of humble means. And he was in favor of having the Society do all in its power to promote window-gardening among those who have little or no opportunity for any other.

The subject for the next Saturday was announced as "The Æsthetics of Horticulture," to be opened by H. Weld Fuller and O. B. Hadwen.

BUSINESS MEETING.

SATURDAY, March 15, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

The Secretary read a letter from Hon. Prosper J. Berckmans, of Augusta, Georgia, acknowledging, with expression of his appreciation and thanks, the receipt of the resolutions passed by the Society in memory of his father, Dr. Louis Édouard Berckmans.

Adjourned to Saturday, March 22.

MEETING FOR DISCUSSION.

The Æsthetics of Horticulture.

By O. B. Hadwen, Worcester.

This subject would inspire almost any other than myself with words corresponding and giving expression to the harmony and beauty of the science of horticulture.

The long term of gray weather and thaw has removed the blanket of snow and ice from the fields and gardens; the ground fairly steams with dampness and evaporation; plants that have long been protected from the zero blast, and from the vicissitudes of winter, by the snowy covering, are now recognized in the aspect which they wore when nature kindly bestowed that covering on them.

We take our first walk among the trees and shrubs, inspecting wood and twigs of late growth; inquiring to what extent the cold has pinched and injured the cells of wood and bark, or even destroyed the bud containing the embryo flower, — the fond hope of spring and summer.

The crocus, hyacinth, and tulip already peep above the earth and through the litter spread over them for their winter protection. The buds of the flowering shrubs look plump and full, but it is yet too early to predict a profusion of bloom. Trees have been divested of dead limbs and twigs by the icy turn, and the ground is strewn with débris. Only a few leaves remain upon deciduous trees; and on the Tulip trees, the dried cups are all that is left to remind us of their last year's verdure and bloom. The grass on the lawn and terrace has not yet browned, and looks even greener than in droughty autumn. A few short weeks, and the forces of nature will again be active; plants, after their prolonged winter's nap, will awake, like the healthy child, with a sweet smile, and soon be aglow with leaf and bloom.

Trees in immense variety, both indigenous and foreign, adding grace and dignity to the landscape, and whose long lives outlast generations of men, will soon begin to push bud and leaf, and each will put on its habitual luxuriance, and manifest the mysterious orderings of its annual growth beyond the scope of human mind to fully appreciate and enjoy.

But enough perhaps of preface. The paper opening our discussion should at least touch, even if but briefly, the subject of the hour, its sources and its extent. It has enraptured the lovers of nature in all ages, and is none the less fresh as time goes on, since new and suggestive lights are continually thrown upon it. The practice of horticulture has come down from the oldest countries and the earliest generations of men; and yet the mystery of even a single plant has never been solved, nor the study of its features and habits exhausted.

As we view the premonitions of the awakening of nature, we are impressed with God's goodness in creating the infinite variety of plants, flowers, and fruits indigenous to different countries and climates, each and all having form, size, shape, and color, distinct, and beyond comprehension, wonderful. We see the workings of the living principle contained in every seed, and directed by conditions that are beyond the power of the human mind to understand. We note the capacity of plants to extract from the earth and atmosphere food and nourishment, and to develop bud, leaf, flower, and fruit in constant succession, unvarying in type and variety, each true to its kind, — yielding, at maturity, food for man and beast, as well as for insects innumerable; and by decay, in a longer or shorter period of time, supplying food and nourishment to the life and growth of other plants in endless rotation.

We see the Divine wisdom in so forming and arranging the faculties of man that he is enabled to learn and appreciate the marvellous diversity in form and size, and the wonderful and happy blending of color in the tints and shades of a thousand flowers. What in nature is more refreshingly beautiful? Man can understand, to a certain extent, the organism of flowers, — the pistils, stamens, and petals, and their functions, and the microscopic pollen or fructifying particles of the flower, which the scientific horticulturist makes use of in cross-fertilizing or hybridizing, tending, under the guidance of experience and skill, to produce new and distinct varieties, — a process which, with intelligent guidance, seems destined to end only with creation itself. He sees the office of insects in conveying pollen from flower to flower, producing seeds containing germs in variety without number, yet keeping each variety distinct. In the apple and pear, no two seedlings, thus far, appear to be alike; there is but one Baldwin apple and but one Bartlett pear that have ever been produced from seed; and the same is true of the hundreds of varieties that are designated by name.

While horticultural science assures us of the germinal principle of seeds, we are as yet unlearned in the methods by which the qualities of flowers and fruits are transmitted from one to another through the pollen. This remains to be ascertained hereafter.

The study and practice of horticulture has a tendency to raise man to a higher level. It quickens and intensifies his senses of sight, smell, and taste, and increases his mental scope and his capacity for the enjoyment of life. How readily the eye of the horticulturist detects upon our tables a new flower, fruit, or vegetable! How quickly we scent a new fragrance and aroma! How fastidious and sensitive is the taste when a new fruit is brought to the test! How diplomatic yet emphatic is language if it is found deficient in any particular!

Horticulture has largely contributed to refinement and good taste in the embellishment of the grounds about dwellings. Through it the highways are made delightful with trees, gardens are tastefully laid out, forming a pleasure in themselves, and an element of beauty in the landscape. Wherever it touches it gives the impression of wealth and happiness in nature, which it skilfully enhances through contributions rich and unique, coming from different lands and contrasting climates.

The philosophy and science of horticulture seem to have been understood to some extent even in the remotest ages. They are mentioned by Confucius, who lived five hundred and fifty years before the Christian era. Among other things, he says: "Heaven in producing mankind gave them their various faculties and relations with their specific laws; these are invaluable rules of nature for all to hold." He speaks of seed planting thus: "Let it be sown and covered up, the ground being the same, and the time of sowing likewise the same. It grows rapidly up, and when the full time is come, it is all found to be ripe, although there may be inequalities of produce, that is owing to the difference of soil, as rich or poor, to the unequal nourishment afforded by the rains and dews, the different ways in which man has performed his business in reference to it." The Greeks, even back to the fifth century, were not strangers to horticulture; they speak of the details of its practice with as much intelligence, precision, and enthusiasm as do many of the present day; the same general principles seem to have been equally well understood and applied. Fruits were grown from seed, though probably not by artificial cross-fertilization, as now practised by the more intelligent. One of their poets gives a

description of his fruit garden in flowing verses, from which we copy: —

> "The branch here bends beneath the weighty pear,
> And verdant olives flourish round the year;
> The balmy spirit of the western gale
> Eternal breathes on fruits untaught to fail;
> Each dropping pear a following pear supplies;
> On apples, apples; figs on figs arise;
> The same mild season gives the blooms to blow,
> The buds to harden, and the fruits to grow."

Thus have I briefly touched upon horticulture, not to elaborate any of its phases, not as a teacher in the culture of fruits or flowers, not even to attempt a solution of the wondrous sciences so intimately allied to it, but only as a student of the farm and garden, and in obedience to the call of the chairman of your committee.

Discussion.

Rev. A. B. Muzzey was first called on, and said that the love of gardening is natural to every well-ordered mind. In the practice of horticulture in its highest branches three things are necessary: first, a practical knowledge of the subject; and to supply this, these discussions are held and papers of a practical cast are read; and the comments on these give us the experience of our best cultivators. Second, money is wanted, and, with a right spirit and culture, the more the better. He was glad to see men grow rich honestly and furnish the means for refining and elevating pursuits. But, third, comes the question, What is the ultimate object of these pursuits? Is it that men may raise beautiful flowers and form landscapes with beautiful views? Something beyond this is needed. The endeavor to produce marketable fruits and flowers is a most laudable one. Man has an inherent love of these beautiful things, and through them a deep and glorious part of human nature is ultimately reached. Some are content for a time with the practical view; but sooner or later there comes a point where we must increase the taste for the beautiful. There is among the American people a great lack of culture and taste; and if this Society does not assist in educating the taste of the community, it will, in part at least, have failed of its object. For every reason

we should cultivate the æsthetic view of horticulture. There is something wanting in any man, whatever his material wealth may be, who has no sense of the beautiful, and does not know what a magnificent world he lives in. The speaker did not wish to be understood as disparaging wealth or any material good; but these things are of the highest use only when that use is inspired by an enthusiastic love of beauty. Why has the great Artist so clothed the world in beauty, but that it may be appreciated and enjoyed by his children?

Edmund Hersey felt that the Society had before it a subject full of interest, and one which ought to engage the attention of all. The book of nature is the most important we can study; for it will lead us up to a higher level. The love of nature is one of the most important things we can possess; it is better than money, for, let a man imbued with it go where he will, he will have lessons of instruction and enjoyment. Money is necessary; but, with that alone, what does life amount to? We want something higher than bread and butter. An individual without a dollar can enjoy much of the beauties and glories of nature. This Society has done much to provide elevating entertainment and information for the public, and the speaker hoped that the discussion of this subject would lead us to something higher than material good, and to see in our fields something more than money.

E. W. Wood said that the refinement of a community may be accurately estimated by its taste in the cultivation of flowers. In the older countries of Europe this taste is far more general than here, but probably, as our country grows older and more mature, a love for flowers will become more general. An enthusiastic admirer of flowers once invited him to visit his flower garden at five o'clock in the afternoon, when it would appear to the greatest advantage. He accepted the invitation, and found a garden of about an acre, with the handsomest display of flowers he ever saw. The owner came out to meet his visitors, but when they inquired the names of his flowers, he hardly knew one, and was obliged to ask his wife, who was familiarly acquainted with them, and derived from them an enjoyment which he could not. The owner expressed deep regret that in his early days he had not acquired more knowledge of botany, for from want of it he was now deprived of much of the enjoyment which his garden would have afforded. Mr. Wood also related an anecdote of the late Joseph Breck, one of the presidents of this Society, who was riding in a horse-car with a

large bouquet in his hand, when a little girl kept passing back and forth before him, and evidently admiring the flowers so much that he took out some and gave her. Some time after, he was riding again, when a little girl, whom he did not recognize, kept passing before him and looking up at him, and on his asking her if she knew him, she replied, "Oh, yes! you are the gentleman who gave me the flowers." The good man turned to a friend who was with him, and with tears in his eyes, said, "We can afford to be at some pains to grow and distribute flowers if they give such happiness as that." The speaker thought that the greenhouse might be made one of the most valuable means of education; he considered it next to the school-house. The study of botany at school from text-books, without the illustration of living specimens, is dry, but with these it may be made exceedingly interesting. He regarded the man who raises flowers where none grew before, as a greater benefactor to the community than he who raises two blades of grass where but one grew before.

Charles M. Hovey was much pleased that the subject had come up, and said that the roses and other flowers in his greenhouse would speak for his love of flowers.

John G. Barker said that he had been much interested by the remarks of the gentlemen who had preceded him, and especially by those of Mr. Muzzey, which carried him back to his first acquaintance with that gentleman, growing out of a common love of the beautiful. They then spent a pleasant hour together, and the ties then formed had strengthened up to the present time. The love of flowers is something that brings us all together. We are all glad to visit the grounds of Mr. Hunnewell, Mr. Sargent, and the President of the Society, and others, and we feel grateful that their wealth is expended not to benefit themselves alone. Mr. Barker spoke particularly of the visit of a committee, of which he was one, to the late Alvin Adams, at Watertown, to solicit contributions to one of the Society's exhibitions, and of the courtesy and cordiality with which they were received, and said that when he remarked to Mr. Adams that he had one advantage over him, in enjoying his beautiful grounds and picture gallery without the expense and trouble of maintaining them, Mr. Adams replied that he had one advantage over Mr. Barker, in possessing the means to provide such enjoyments and welcome others to them, and that this was part of what he lived for. The same spirit actuates the other gentlemen referred to, whose grounds have been freely

opened, and have been a source of the highest and most refined enjoyment to thousands.

Our public parks and cemeteries have tried to do something in educating the taste of the people. The Public Garden, in Boston, has given rare enjoyment to multitudes who had not the time or the means to go elsewhere to see beautiful plants and flowers. Some of the arrangements may be open to criticism, but the speaker was not here to criticise. The adoption of the landscape plan in laying out cemeteries is both the result of improved taste and the cause of further improvement. It was first put in practice in Spring Grove Cemetery at Cincinnati, and in West Laurel Hill at Philadelphia; and now scores of new cemeteries are springing up which are all laid out on this plan. It should not be forgotten that this Society was the first to set the example, which has been followed in hundreds of towns and cities, of forming a cemetery where everything should be done to make the place one not to be dreaded, and it was the intention of the Society, expressed at the time, in anticipation of the instances above mentioned, that Mount Auburn should "ultimately offer an example of landscape or picturesque gardening." The speaker was glad that the plan tried last year, of opening Forest Hills Cemetery to all on Sunday, had proved so successful. The same had always been done at Pine Grove Cemetery, Lynn, of which he is superintendent, and no injury had resulted, but the effect on the visitors was excellent. Our Saviour drew most of the illustrations of his teachings from the flowers, and his words: "Consider the lilies of the field how they grow; they toil not, neither do they spin; and yet I say unto you that even Solomon in all his glory was not arrayed like one of these," justify us in doing all that we can to extend the love of trees and flowers.

William D. Philbrick remarked that he would like more simplicity of taste in gardening than is prevalent, and less of stiffness and conventionality, and fewer expensive and showy attempts at artificial effects. We should try to study what is beautiful in itself. He thought too much attention was given to expensive exotics, and too little to the more graceful and delicate native wild flowers of our own woods, many of which are easily domesticated. No flower of the garden gives him more delight than our wild columbine.

John B. Moore agreed with those who had spoken of the importance of being able to appreciate beauty. He desired to see a taste

for the beauties of nature cultivated to the fullest extent. He agreed with Mr. Wood, that those who possess a knowledge of botany have an enjoyment in flowers which others cannot have. Especially is such knowledge desirable for young men on farms, if they would enjoy rural life. He regretted that he had not himself understood its importance and given attention to it when young.

Nathaniel T. Kidder was very much pleased to hear Mr. Philbrick say something in praise of wild flowers. He is himself fond of making small effects; he had found them more satisfactory than large ones, — planting, for instance, a group of golden-rods in a sunny corner, or ferns in a shady one, to hide unsightly objects.

David W. Lothrop said he was surprised to find so many people who have very little idea of the beautiful. The love of it must, in a measure, be cultivated while we are young, to bring out our latent æsthetic tendencies. One of the greatest difficulties, however, in doing this is the absence of a standard of taste. Edmund Burke wrote on the Sublime and Beautiful, and in later life ridiculed his own propositions. There is some danger, the speaker thought, of overdoing this matter, and getting beyond the bounds of good sense. He related several anecdotes showing the inability of some people to readily perceive the beautiful; one of Dr. Lyman Beecher, who, on being shown a fine landscape painting embracing a man shooting game, simply exclaimed, "He's bagged three of them!"

There is a prevalent idea that the country is beautiful only in the summer; but the true lover of the country knows that it has its beauties in the winter as well. It is certainly cleaner and purer then. He advised the painting of country residences with warm, neutral tints, instead of white, which makes them look cold and cheerless, like snow-banks, and the planting of evergreens around them for shelter or beauty, which, when the limbs are borne down with snow, will look almost fairy-like. He thought it the duty of rich men to retire from business when they have made money enough, and to give beauty to the country as far as they have the ability.

Cemeteries are now made so beautiful that they seem to lessen our regret at death. Downing has been the oracle in landscape gardening, and the influence of his writings has, in the past, wrought a great change in landscape gardening and rural architecture, though these arts (as understood in his day) are now much changed, under the influence of new and fanciful ideas.

C. Terry said that the most beautiful objects in the fine arts

are but copies of the beauties of nature, and the artists who have done their best fall below nature. Those who enjoy beautiful natural scenery stand on a higher plane than those who do not. There is nothing more beautiful than the blossoms of fruit trees; and it is a striking fact that there is no fruit until after the flower, — beauty comes before reproduction. The study of the growth of plants is the study of the Creator himself, and we are never so near to him as when engaged in the study of his works. In this connection the speaker quoted Tennyson's lines: —

> "Flower in the crannied wall,
> I pluck you out of the crannies,
> Hold you here, root and all, in my hand,
> Little flower; but if I could understand
> What you are, root and all, and all in all,
> I should know what God and man is."

It was announced that on the next Saturday William T. Brigham would give some account of his observations of vegetation in Central America.

BUSINESS MEETING.

SATURDAY, March 22, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES in the chair.

No business being brought before the meeting it adjourned to Saturday, March 29.

MEETING FOR DISCUSSION.

THE GUATEMALAN FORESTS AND THEIR FUTURE.

By WILLIAM T. BRIGHAM, Boston.

For more than three centuries the forests of Central America have been pictured in the popular imagination as the chosen home of nature's most vigorous work, whether in the vegetable or the animal kingdom. Ever since Hernan Cortez forced his way through their mysterious recesses, in that wonderful march of his from Mexico to Honduras, those forests have been looked upon

as no fit home for man in his higher development. Trees of immense size and bizarre forms, palms, orchids, and ferns, covered the land and even encroached upon the beds of the rivers and lakes. Monkeys of many sorts lived on the topmost branches, and chattered defiance to the jaguars on the lower stages. Huge boa-constrictors hung by their tails and whipped up the unwary deer, whose companion had just fallen prey to the alligator, in the reeds by the drinking pool. Vegetable fences more annoying than the execrable barbed wire, armed with poison as well as thorns, barred every path to man, while giving free passage to serpents, alligators, jaguars, and a host of smaller annoyances. When man rested from his weary labor in cutting through these tough defences, centipedes and scorpions lurked in the fallen log on which he sat, or ants, more terrible than either, penetrated every crevice in his clothing; mosquitoes bit him, vampires sucked his blood, jiggers laid their eggs in his flesh, and the cries of birds, beasts, and insects drove sleep from his eyes. To these visible enemies came that terrible ally, invisible and dreadful as the "kenaima" of the Indians of Guiana, the "pestilent congregation of vapors" that engendered fevers and plagues.

It was not an attractive picture, and it is not strange that the crowded, starving denizens of our cities did not gird their rags about their loins and journey southward to that region of plenty— of plagues — "muchas plagas," as the Indian of today exclaims in his fruitless endeavor to escape fleas and flies. Were this a true picture it might well be left with its face turned to the wall of the Cordilleras, while busy man works and thinks over that part of God's earth that is at least easier to subdue and tamer when conquered. Popular imaginings generally have but a very small kernel of truth in them; even in a great and enlightened country the real truth is usually cherished by the constantly outvoted minority. In the matter of tropical forests the minority found out early in the seventeenth century that there were at least two things in the forests of Honduras and Yucatan worth braving all dangers for, — mahogany and logwood. Until recently, however, little else was known about these forests than that they were difficult of access, and, except to the naturalist or hunter, little attractive.

Some forty years ago notice was first taken in a trustworthy way of the remarkable remains of a former civilization that once lived and built cities, and carved monuments and altars, where

now are seemingly primeval forests. The hardy explorer, on felling some mighty tree, found himself face to face with a stone image of gigantic proportions, elaborately carved, and bearing on its sides long inscriptions in an unknown tongue. Further search brought to light many other remains, until now a score of cities has been unveiled and partly described in the dense forests of Central America. I refer to these remains, some of which I have myself seen, only to show you that these forests, so ancient in appearance, are subsequent to a time when man — highly civilized man — dwelt on the rich plains where now trees are uprooting and vines are pulling down his sole remaining monuments.

Let us first examine the forests of the shore region, which, with the exception of portions of Yucatan, extend from southern Mexico to the Isthmus of Panama and into South America; and they are not confined to the shore limits, but follow all the great rivers, as the Usumacinta, Polochic, and Motagua far inland, filling their broad valleys with an almost unbroken sea of vegetation. I have seen the forests from Aspinwall to Panama and along the Pacific coast of Central America; but my explorations have been limited to those of Guatemala, which I believe to be fairly typical of the whole.

Along the salt-water we may have simply groves of coconut or the dense and undesirable Mangrove (*Rhizophora Mangle*), which is excellent for posts, as the dark red wood is very hard and durable, but not straight; and beyond this shore belt, whether wide or narrow, the forest begins. As we enter, one point strikes us in which the forests of the tropics differ widely from those of the colder regions. In Europe, even more than in North America, forests are often composed almost exclusively of one kind of tree, — the oaks, the pines, the firs, the beeches. With us, we see Hackmatack clannishly gathering in one part of the country, while the Redwood (*Sequoia sempervirens*) meets all by itself in another; and if we find the oak, walnut and chestnut altogether in one woodlot, we have at least many of each species. In the tropics you may stand in almost any forest path and not see more than one tree of a kind, — there may not be a dozen of a kind to the square mile. It is like a vast collection of samples only. To this broad statement there are exceptions to be noted presently.

The sense of confusion is almost like that one feels in a strange city in the bustling market-place, where all is active eager life, and every face unknown. Trees we have known from a few withered

leaves are now unrecognized because they are living and not dead, and their tall stems put out of reach and almost out of sight the foliage, flower, and fruit. I have looked for many minutes before I could determine from which tree certain blossoms or nuts lying on the ground had fallen. It is not due to any especial crowding of the trees,— the virgin forest is not crowded, — for the huge patriarchs, like so many human chiefs, extinguish and crush out the younger race at their feet. Hence the forests are generally open except on the banks of rivers and near clearings. There is no sod, whether of grass, as in the Eastern States, or flowers, as in the West; only the bare earth close up to the tree.

When one is at last able to orient himself, and place in its relative importance the vegetation around him, another perplexity arises. Here, we are aware that an ordinary tree is a camping-ground for innumerable smaller plants, mostly lichens or mosses; but these are relatively so small that, except perhaps the Usnea of our spruce swamps, they attract no attention. Even the mistletoe is not important enough to make us lose sight of the oak on which it grows. In the tropics all is changed; one branch of a tree is loaded with attractive crimson blossoms, not unlike a Bouvardia, while another has the pale-green feathery flower of an Acacia or Inga, and it requires a careful examination to determine which is the interloper. Whatever may be the case with humanity in these regions, vegetable society is decidedly mixed; but the social element predominates to such an extent that an isolated tree — a vegetable bachelor — is a great rarity. Parasitism is fearfully prevalent. Seeds germinate high up on a branch where some bird may have left them; as they grow they cling to their foster parent, throwing their stem and branches high above her, crowding her out in the struggle for life until — poetic vengeance — her decaying trunk drags in its fall her murderous parasite to the dark shades of the under forest, where withering death awaits it. I have often seen branches so loaded with Orchids, Peperomias, or Bromeliads that the weight of these after a shower broke down the branch, throwing into the river beneath what would stock a hot-house.

Not less important than the ordinary parasites are the vines which hang from tree to tree, and play so large a part in the useful arts of the forest ranger. I have crossed a torrent more than a hundred feet wide on a scientifically constructed suspension bridge made wholly of these vines; I have lived in houses where every

post, and beam, and rafter, and all the palm-leaf thatch was bound together by the smaller vines. You may mend your bridle, catch your fish, tie your shoe, with these vegetable cords; and it is hardly necessary to say that their rough fibres block up the paths and require an almost constant use of the machete[1] to clear the way. While I do not know that these creepers bear any edible fruit, — indeed, I have seen the leaves of only three or four kinds besides the sarsaparilla, the long slim bodies bearing leaves only high up on the tree-tops, where the foliage is indistinguishable from that of the supporting tree, — and they give nothing to eat, one large kind, the *Vejuco de agua*, or *Vejuco de estrella*, is a most refreshing source of water, yielding, when cut in yard lengths, a cupful of clear, cool, tasteless water from each length, — a most refreshing beverage in the close, hot forests. It may be interesting to some of my hearers to know that the much sought sarsaparilla is a very troublesome vine, often as large as one's finger, bright green, and, like its northern kinsman, the "wait-a-bit" thorn (Smilax), is armed with large hooked spines. The portion used is the fibrous root, which is removed, and the docked stem replanted, with no worse result than a temporary suspension of growth. Another vine or liana (Bauhinia) is exceedingly curious, from its close resemblance to a chain when age has accentuated the different rates of growth between the middle and edges of its flat, ribbon-like stems.

If I have left the pillars of the forest until the last it is because I cannot describe them without covering the whole extent of arboreal forestry in the tropics. A picture of one conveys no idea of another, and I can only, in the confused way so natural to a tropical forest, describe here and there a specimen.

I know you will first expect to hear about the palms, which are perhaps the type of tropical vegetation. I need not describe the Coco palm, as it is not a forest but a shore tree, loving strongly the salt-water. Next to this comes the Cahoon (*Attalea cohune*), a tree of medium height, the stem covered with the butts of perished leaves, while from the base of the cluster of pinnate, feathery leaves which crown the trunk hang several large clusters of nuts of the size of a pullet's egg. These contain a valuable oil, but are so hard as to require peculiar machinery to crush the tough shell. Many tons could be gathered with little labor, and the supply extends all along the coast. When young the Cohune is called

[1] A long, heavy-bladed, straight-edged knife.

Manàca; when age has removed the leaf butts and left a smooth stem it is called Corosa. This palm grows only in the richest soil. The Manàca is stemless, but sends up a grand cluster of pinnate leaves, even thirty feet long; which meet in graceful curves above the paths, in many places forming aisles and groined arches worthy of imitation in any Gothic temple. The leaves are the most important article used for thatching, lasting, under favorable circumstances, six or seven years. It is interesting to watch the building of a *champa*,[1] in which the palm leaves play a most important part. A half-a-dozen men select and clear the site in the forest, and then scatter in search of suitable trees for the frame. Soon the blows of their machetes are heard on all sides, mingled with the crash of falling branches. After a little while they meet again, each with his house-stick; and I was always strongly reminded of the labor of the ants, for, while there seemed little or no foretalk or consultation, each brought suitable sticks; two, the large aucones, or house-posts, others the braces and rafters and ridge-pole, mostly of the slim, durable Santa Maria tree. Perhaps half a day was consumed in gathering the materials, and the rest in tying the frame, skilfully planned, together with vines which shrink in drying, and bind the joints very firmly. Next day the manàca leaves are split in halves (the midrib being as large as a man's wrist) and tied to the frame of the roof, and the house is completed by a carpet of smaller palm leaves. Not a drop of the heavy tropical rains can find its way through this thatch.

There is a small, slender palm, whose buds are eaten as a vegetable. The Indian name is *pacaya;* but I do not recognize the genus (Chamædorea?). The very common Astrocarya, its slender stem armed with spines, has also an edible but not very attractive fruit; and the same remark applies to the Desmoncus.

Of the better known trees the Mahogany (*Swietenia Mahagoni*) is found in abundance, but so ponderous is its timber that only near streams can it be readily got out. Not only is this a most valuable timber, but as a tree it is preëminently majestic. I was impressed eighteen years ago with the rows of these grand trees cultivated in the Botanic Garden in Calcutta; but in its native forest it far surpassed those feeble representatives. Towering nearly one hundred and fifty feet high, its thick head far above the dense foliage, and its stem sometimes twelve feet in diameter, it is

[1] Corruption of camp.

not easily forgotten, and I should place it beyond the Sequoias of California in impressiveness. It is noteworthy that while the mahogany of Mexico is softer, and commands a higher price in this country, that of Guatemala and Yucatan is heavier and harder, and is of greater value in England. Mahogany land is valuable not merely for a single cutting, but in thirty years the tree has grown again to a size of two or three feet in diameter. The life of a mahogany cutter is not an easy one, for when the hunter of the gang has found the trees, — and the clumps may be miles apart, — roads have to be cleared to the nearest stream and everything made ready to move the heavy log rough-hewn, — it may be four feet square and thirty feet long, — as soon as the dry season has sufficiently hardened the soil. The logs are finally squared on the shore before shipment. In Guatemala benches, stools, paddles, wash-tubs, etc., are made of this fine wood; and I have seen the last carved from a single butt five feet in diameter.

A tree called a cedar, but not even a conifer, is much used for canoes; and I made a voyage of seven days in one fifty feet long and five and a half feet wide, of good model and strong. But it is not merely in size that the trees are remarkable. Owing to the looseness of the soil and the small extent of root required to nourish the tree in such extraordinarily rich land, some unusual support is necessary to steady the trunk, and large buttresses are thrown out twenty or thirty feet from the cylindrical stem on all sides, and, as in the case of the well-known Paddle tree of Guiana, these wings are thin and plank-like, and form recesses, one of which measured thirty-five feet across. This formation appears on at least a dozen different trees, including the Guava, a tree generally noted for the roundness of its smooth trunk when grown out of the forest. The Ceiba (Eriodendron) exceeds others in the number and extent of its buttresses, while the specimens I have seen isolated in court-yards or public places exhibited no such formation, although I measured one at Sacapulas forty feet in circumference. Not unfrequently these projections imitate the flying buttresses of the Gothic architects and become partly detached from the main trunk, splitting so as to form ladders by which one can climb to a considerable height.

As the economic as well as the picturesque features of the forest presented themselves to me I was puzzled to know how my Carib wood-cutters would fell such monsters in clearing the land. They built a stage high up at the point where the buttresses coalesced

with the trunk, cut the tree there, and left a stump some fifteen feet high, which the ants or other insects would remove in the course of another year.

Many of the trunks were white or gray, like birches and beeches, and on these the Vanilla plant was often found. The India-rubber of this region is not the favorite house plant, the Ficus, but a very different tree, *Castilloa elastica* (Urticaceæ), a rapid grower, and common in the forests and by the pathways. The improvident cutting of very young trees has now been stopped by the government, which also offers a bounty for the cultivation of this valuable plant, which has hitherto been left, as the sarsaparilla still is, to the Indian collector, who brings in the gum in flat masses weighing from one to three *arobas* (twenty-five to seventy-five pounds.) The Cacao comes next in importance, and I have found pods containing thirty-five nuts, of a quality finer than that of Caraccas, growing wild in the forests of the Chocon. The blossoms being on the trunk and not on the branches, give a peculiar appearance to the tree, which otherwise is not unlike a beech. I must pass by the acacias, rosewood, and sapotas, only mentioning that the last two are much used for posts and underpinning, as they do not readily decay nor are they eaten by insects.

Perhaps the two most characteristic forms of tropical vegetation are the Palm and Banana, and the latter in some forms appears in almost every forest view, the wild forms having tougher leaves and most curious inflorescence. The members of the ginger family look much like dwarf bananas, and some, as the Alpinias and Hedychiums, are very showy.

And what of the flowers in all this vegetation? First, I would place the wonderful Palo Cortez, a tree of considerable size, which was in December literally covered with blossoms of the color of the Judas tree (*Cercis Canadensis*), but of the size and shape of foxgloves, and in clusters like rhododendrons. I never saw two trees together, but the brilliant spots or, rather, masses of color dotted the forests at intervals of a quarter of a mile. A leguminous deciduous tree is much more common than the Palo Cortez, and in February makes the mountain sides brilliant with its golden blossoms, which are produced in great profusion and precede the leaves. A tree that I believe to be an acacia, but whose beautiful feathery crowns of pale green flowers were inaccessible, was common along the rivers; and the orchids displayed most brilliant colors on the stems of otherwise flowerless trees, as did several

Bromeliads and Aroids. On the whole, the flowers are large, coarse, and destitute of odor — by no means florists' flowers — indeed one could hardly pick a nosegay in a day's journey through the best of these forests, while the botanist would revel in the rare and interesting forms.

Insects were not so common as might be expected, and the day mosquitoes were absent; the centipedes small and sluggish, and the butterflies, while resplendent, and often of great size, were almost solitary. The tracks of wild hogs and peccaries were common; and I have seen the spoor of the tigre (jaguar) and puma, but serpents were invisible, although once and again I was startled by the resemblance the great vines bore to the monstrous boas and pythons. One of my men, it is true, felt something unusual on his bare foot and found it was a *tamagousse*, a very poisonous snake, but he raised it on his foot and cut it in halves with his ever-ready machete.

The earth in most of these forests is of a deep chocolate color, and in one place where the men had cut into a bank I measured fourteen feet of this richest of soils. The temperature varies from 70° to 86° F., and the annual rainfall is about 88 inches.

The practical use of this land covered with what seems a primeval forest is at least as remarkable as its present covering, and I have been assured that it would be interesting to you to hear somewhat of the planters and how they treat this soil. And first the clearing. Carib mahogany cutters fell the trees during the months of January, February, and March, and during April and May the fallen timber dries and is burned, only the huge logs and stumps being left for the ants to remove. The field is then tolerably clear and ready for planting, which should be done before the rainy season begins in June. The crops best adapted for cultivation are in a measure indicated by the existence of wild specimens. Thus the cacao, which abounds wild, is a most desirable crop. Rows of bananas or plantains are set out fourteen or fifteen feet apart, to protect the young cacao trees until the Erythrina or madre-cacao (*Erythrina umbrosa* and *E. velutina*) are sufficiently grown, for the cacao is impatient of the direct sun.[1] Plants are raised from the seed, and begin to flower at three years, but do not bear a good crop until five years. There are two crops yearly, one in December and January and a larger one in May and June. In these forest lands the only culti-

[1] A much better protection for the cacao is the India-rubber, and on my own plantation I have planted the Castilloa forty feet apart, or one tree between every third tree of cacao. The yield of a large rubber tree is eight gallons of milk, or sixteen pounds of rubber, each year.

vation required is to keep down the weeds. Floods or excessive rains rather benefit the trees. The average life of a cacao tree in these lands may be placed at forty years, and the yield at about a pound and a half annually. Formerly the Indians used the cacao nibs as coin. The pulp enclosing the seed, tastes like unripe watermelon.

Pineapples grow wild wherever there is a clearing, and the quality is far better than any we find in our markets. When planted three and a half feet between the rows and two and a half feet in the rows, an acre will contain 4,840 plants. The cultivation consists in cleaning the field five or six times a year, and the first crop is ready in sixteen to eighteen months after planting, when the lateral suckers are used for this purpose; the terminal sprouts require two years or even three, but thereafter ripen annually. The first crop may be computed at four thousand good pines per acre, which, at ten cents apiece, would bring a fair income. If the fruits are fully ripened and preserved there, a much finer flavor is obtained than when the green pines are shipped. I am assured that in these forest lands no replanting is necessary for many years, and it is only needed to thin out the plants yearly. The wild *Piña de azucar* averages five pounds in weight; but the Horse pine is more acid and highly flavored, and so better for preserving.

Nutmeg trees find here a most suitable soil and climate. This beautiful and interesting tree grows to a height of twenty feet, and is very long-lived. It begins to bear at the seventh year, and by the tenth the yield may attain to five thousand fruits, and the largest of these count sixty-five to the pound. Thus the return per acre, at sixty cents per pound, would be over three hundred dollars, besides seventy-eight pounds of mace, worth, in our market, forty dollars.

Coconut planting is perhaps one of the most profitable ventures, as, after the first two years, no care is required. At five years, they begin to bear, and two years later, the crop in these favored lands should average two hundred nuts a tree; and I have seen a tree in Livingston that averaged a ripe nut every day in the year; and this tree is not more than twenty years old.[1] Now 2,500 trees planted as a border or fence will, in seven years, yield 500,000 nuts annually, or, at twenty dollars per thousand, $10,000. This is wholly neglecting the valuable fibre or coir, which is wasted in Guatemala.

[1] On an average coconut spadix I counted 52 female and 5,950 male blossoms.

There is no especial season for coconuts; blossoms, buds, and fruit, in all stages, may be seen on the trees at once. The nut is eaten only in the green state, when the shell is so soft as to be cut easily with a knife. The cream is eaten with a spoon, and, so far as my own experience goes, is not indigestible; the milk is always cool when on the tree, and fresh as any water from a New England spring. Once, when travelling in the Hawaiian islands, I had, for ten days, no other drink.

Bananas are cultivated on all these bottom lands with great success; and it is well known that 1,607 square feet of land planted with bananas or plantains yield 4,000 pounds of nutritive food, or a support for fifty persons, while the same land planted with wheat will support only two. The number of fruit steamers plying between Guatemala and the ports of New Orleans and New York has greatly stimulated the production of these most valuable fruits, and, even at forty cents a bunch, delivered on the steamers, the cultivation is exceedingly profitable; so that a fruit company in Belize is now paying twenty-four per cent dividends, although only one-fourth of its capital has been called in.

Great mistakes have been made in the cultivation of the banana, especially in not giving the plant room enough, for, if crowded or shaded, the bunches, which may weigh ninety pounds, dwindle to twenty-five, and are no longer marketable. The plantains are much larger, often twelve to fifteen inches long, of firmer substance, and generally eaten cooked; and it is a matter of surprise and regret that we do not find this most excellent vegetable in our market. It commands a higher price than the banana all along the Central American coast. In the case both of the banana and plantain, when the fruit has arrived at maturity, the stem which bears it is cut and left to rot on the ground; but the fibre, although not so abundant or fine as that of the *Musa textilis*, is yet of considerable value, if only a suitable machine were at hand to put the fibre into a marketable condition. Dried bananas have been brought here, but have not proved popular, although they keep well, and are very nutritious. Dried plantains are much finer than figs, and it is to be hoped that they will soon be abundant in our markets.

I need not say much of the corn, the *maiz* of the Spaniard, but three crops grow in succession each year; and I have found corn on stalks so high that even on horseback I could not reach the ears (three to a stalk), and had to fell this corn tree to get the ears for my horse. Corn hulled and mashed is the principal breadstuff

of Spanish Americans, while the cassava bread is preferred by the Caribs of the shore.

India-rubber (*Castilloa elastica*) may be cultivated with great profit, although at present the supplies are drawn from the wild trees. Cotton grows here of as fine a staple as on the Sea islands, and is now being planted experimentally.

I have left to the last the two most important, coffee and sugar-cane, and I had almost forgotten the oranges, lemons, limes, citrons, pompelnoes, and shaddocks, which grow here as well as in any part of the world and yield abundant crops of most excellent fruit; figs, rose-apples, cherimolias, mammees, alligator-pears, sapotas, granadillas, and the host of fine fruits whose very names are strange to us. The bread-fruit of the islanders, the tamarind and papaya all grow here luxuriantly.

While most of the coffee for which Guatemala is so justly celebrated is grown in the department of Alta Verapaz, in the vicinity of Coban, and on the Pacific side of the high table-land of the interior, it has been found that the Liberian coffee flourishes on the Atlantic forest belt. I have visited coffee plantations in many parts of the world, but I have never seen the plant growing better or more carefully cultivated than at Coban, and, if we may judge from a few isolated experimental coffee trees at Livingston, and farther up the coast, the Liberian type will do better than the Arabian. Coffee, as is well known, requires shade, especially when young, and the seedlings must be carefully sheltered from the direct rays of the sun. Bananas are usually planted in alternate rows with coffee. The labor of picking, the care needed in drying, and the mechanical processes of hulling render this a more difficult crop to harvest than any I have hitherto mentioned, and where there is no great depth of soil the land is soon exhausted by coffee, but it is a very profitable crop notwithstanding.

And now a few words as to sugar, the crop to which these rich forest lands seem most admirably adapted. I have seen the Louisiana plantations on the lower Mississippi, and admired the careful cultivation, large and convenient mills, and thriving cane-fields, but when I inquired about the crops, I found that sugar-raising in Louisiana although profitable, thanks to the tariff protection, is evidently a forcing of nature. The planter has great difficulty in preserving his seed-cane through the winter, must plant early and cut late to get all the benefit of a short season, and he must cut and grind before frost comes, or his sugar is turned and

the proportion of molasses greatly increased. Hence he has to have an immense mill in proportion to his acreage, and must grind his entire crop in ten days or a fortnight, while his expensive mill is idle all the rest of the year. The yield seldom exceeds a ton to the acre, of the poorest sugar known in the Liverpool market.

In Guatemala a very different state of things prevails. Cultivation, as we understand it, is wholly wanting. The cleared land is not even ploughed, but a hoe scratches the furrow into which the seed-cane is laid in lengths of two feet or sometimes three if the variety of cane planted be a long-jointed one, and a few strokes of the hoe cover it again. Then commences the fight with weeds; as the planting is done in May before the June rains come on, the first weeding will be needed in June, and the young cane will be high enough by the end of July to get ahead of the weeds; twice at least thereafter the process of trashing goes on. This consists in passing down the rows and breaking off the dead lower leaves and trampling them under foot. This makes an excellent mulching and by the time the cane is in blossom, in December of the following year, the ground is completely carpeted by these leaves. In January the cutting begins, and as there is no frost it may continue three months, if necessary, and the yield averages four tons to the acre of the best refinery sugar. But the most remarkable contrast to the Louisiana sugar-raising is here. While on the often submerged plantations of the banks of the Mississippi the laborious planting must be done every year, in the bottom lands of Guatemala ratoon crops have been cut annually for sixteen years without perceptible diminution in the yield. The first ratoon crop, that is the one that springs up from the cut stalks, is better than the first cutting. Now the saving of labor is immense, and the cost of producing sugar proportionally lessened. Even in such an admirable sugar country as the Hawaiian islands, where the cultivation of cane has probably been carried to as great perfection as anywhere else in the world, the fields have to be ploughed up and replanted at least once in five years. I am familiar with the methods and processes used by the Hawaiian planters, most of whose plantations I have visited within a few years, and I believe that with some of their improvements Guatemalan fields would yield five or even six tons to the acre. And that this is not extravagant you will see if you consider that hitherto only the common wild cane has been cultivated, or rather planted, and the mills are of the rudest sort. Now it is well known that certain

choice varieties of cane, as the Tahitian, Salangore, and Elephant, yield one hundred per cent more sugar than others, and the processes of manufacture have been vastly improved; although even now we get only seventy-five per cent of the sugar out of the cane, on an average, by milling.

But suppose we are satisfied with the average yield of the cane on these lands with good mill and vacuum pan, at four cents per pound, a lower figure than sugar has ever reached there, we have eighty dollars per ton, or three hundred and twenty dollars per acre. The estimated cost where five or six hundred tons are manufactured is less than eight dollars per ton, leaving a reasonable profit after deducting all interest on the investment and expenses of marketing. With the removal of the duty on sugar, which must come before long, when this people awake to the unjust system of protected monopolies at present the law of the land, the cargoes which now go to Liverpool would find a good market in Boston or New York; and the wise legislators will have to devise not only new bounties, but new arrangements of nature to put the curious beet sugar industry in competition with the far better and cheaper cane sugar.

I began by describing in a general way lands in Guatemala, the richest I have found anywhere in the world, as they now exist, and then their possible transformation from the wild and wasteful profusion of natural forest growth, to the more prosaic nature of the farm and garden. I have followed the forest from its removal to the garnering of the crops which may succeed it, and I have not drawn upon my fancy, but upon facts that have actually existed, and processes that are now going on under an energetic and enlightened government, which can look to the natural prosperity of its domain instead of dissipating its revenues by the whims of disreputable congressmen.

I have passed by the vegetable productions of other parts of Guatemala, the potatoes, wheat, cassava, pita, cotton; and the marvellous abundance of flowers, the tree Compositæ, the acres of Stevia, Bouvardia, and Agaves; the Achimenes and scarlet Lobelias by the roadside, the Begonias and Ferns on the moist cliffs, the many Convolvuluses and Ipomaeas on the trees by the roadside, the Callas and spider lilies, the passion flowers and bambus by the river banks.

Even the grand pine forests of the mountains I must refer to but briefly. These grow at an elevation of from five thousand to nine

thousand feet, and attain a size I have never seen equalled except in the Sierras of Nevada. Eight feet in diameter and with straight trunks branchless to a great height, so that the grass grew all beneath these trees and afforded pasturage to large herds of cattle, was nothing uncommon. There were three species, one with needles fifteen inches long, and another that furnishes fat pine for the candles of half the republic; and there were spruces of nearly equal size. It was exasperating to a Yankee mind to see these grand trees cut down, split in halves, and two boards hewn out of the whole log! I have seen an Indian bringing down from the mountains planks five feet wide and not much longer, hewn to a thickness of less than an inch. There are no saw-mills within two hundred miles. I lodged in a house on one of President Barrios' fincas or plantations which was constructed of hewn pine planks, three inches thick, each representing a single tree. With no wagon roads through the mountain region and no probability of their construction in the immediate future, these mountain forests are safe for some time yet, and I certainly hope to see them again and contrast their rugged open simplicity with the dark and tangled mystery of the richer lowland woods.

The President remarked that the tropics had been brought before us in a delightful vision, and he wished to ask Mr. Brigham to explain more fully his object in exploring the forest lands of Guatemala. In reply Mr. Brigham explained briefly the objects of the Tropical Products Company, which had obtained twenty square miles of rich land on the Rio Chocon, and various concessions from the government; and stated that he had explored the entire republic that he might assure himself that the people were contented, and the government stable, and he then explained at some length, the nature of the country and people; the commercial resources and natural advantages as well as the salubrity of the climate; and, in answer to questions, he enlarged upon several topics mentioned in the essay read, the substance of his answers being incorporated in the paper as here printed. He expressed himself as fully convinced by his explorations that the Republic of Guatemala was eminently fitted, above all other tropical countries he had visited, for profitable agricultural enterprises, and that capital and pluck were alone needed to reap rich harvests.

BUSINESS MEETING.

SATURDAY, March 29, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

No business being brought before the meeting it was dissolved.

MEETING FOR DISCUSSION.

FERTILIZERS.

No subject having been assigned for discussion, the President called on Leander Wetherell to speak of "Fertilizers." Mr. Wetherell said that subject included, in its broadest sense, everything used for the fertilization of the garden and farm. The first and best fertilizer, and the one always to be used when it can be got, is stable manure from animals fed on good hay and grain. It has been said by some that the manure from animals fed on linseed or cotton-seed meal is worth as much for fertilizing as the meal; but the speaker did not believe this, though he had been told that cotton-seed meal is used by manufacturers as an ingredient in their fertilizers, and he wondered that farmers did not use it directly. Stable manure, as well as chemical fertilizers, must be used with discretion. The latter can be used with good economy in connection with the former. When planting corn, for instance, it is a good plan, after stable manure has been spread and ploughed in, to put a little superphosphate in the hill, mixing it with the soil. Corn and potatoes started in this way ripened from ten to fourteen days earlier than that which had received the same treatment otherwise.

There is a great liability to fraud in the composition of artificial fertilizers. The analyses by Professor Johnson, of the Connecticut Agricultural Experiment Station, are of great value, giving the cost of the materials, the price at which the fertilizers are sold, and their value to the farmer, the real value being, in almost all cases, from six to eight dollars per ton less than the cost to the farmer. Professor Goessmann's analyses at the Massachusetts Agricultural College are developing similar facts. The materials used in artificial fertilizers are valuable, but the question for farmers is whether they can pay the prices asked for them and get

their money back. An interesting fact was developed by Professor Atwater, of the Connecticut Agricultural Experiment Station, who prepared several parcels of fertilizers, with greater or less quantities of the most costly material — nitrogen; and in many instances superphosphate without nitrogen produced better corn than when nitrogen was mixed with it. If you can use what you want and adapt it to your soil, without the expense of substances not needed, you have secured an important point. On the speaker's farm, plaster proved, by careful experiment, as good on corn as any of the fertilizers that cost much more, the ears and the fodder being weighed in every case. On his father's farm plaster worked wonderfully well, producing three tons of hay to the acre, but on an adjoining farm it was worthless, and there are many farms where it would be of no more value than sand. Professor Anderson, of the Highland Agricultural Society, says that no man understands the action of plaster. Generally, however, it seems most useful on hill land.

In applying commercial fertilizers, every one knows, or should know, better than the chemist, what his soil needs. Study your farm or garden and find out by experiment what it requires. The brains should work with the hands. The speaker had found by experience that his farm does not require potash. The reason why more commercial fertilizers are not used by farmers is that they get so little return from them. Farmers can buy the potash and other elements of artificial fertilizers in bulk, and mix them themselves, thus getting their fertilizers cheaper and purer. A friend of the speaker in Worcester has pursued this course to advantage, buying the elements and mixing them in his barn. Mr. Wetherell believed that market gardeners would buy and use more fertilizers if they knew what to buy and how to use them; but they are differently situated from farmers in the country, because they can buy all the stable manure they need. He tried the Stockbridge formula on two acres of corn on intervale land, and Bradley's superphosphate on another portion, with no other manure in either case. The growth was immense, but the soil was good to begin with. The corn and stover were weighed, and on the ground fertilized with superphosphate both exceeded that from the Stockbridge fertilizer, giving seventy bushels of shelled corn to the acre, and the stover made good feed for milch cows, with very little hay. Another field produced similar results. This was a piece of bound out grass land, turned over and top-dressed with the Stockbridge

formula for corn, and as in the preceding cases, the growth was very heavy. Without ploughing it was seeded to clover and timothy, and produced two heavy crops in each of two successive seasons.

The President said that while we were pleased to see young men at the meetings, we were also glad to greet the founders of the Society, and introduced to the meeting, Henry A. Breed, of Lynn, who, except John B. Russell, now of Newmarket, N.J., is the only survivor of the sixteen gentlemen who, on the 16th of February, 1829, met at the office of Zebedee Cook, jr., in Congress street, to form the Massachusetts Horticultural Society.

Mr. Breed thanked the Society for the compliment paid him, and said that he was eighty-seven years old, and that though he enjoyed good health he was not able to attend the meetings of the Society as often as he would like to. He had been sixty years in business, having been educated in one of the first mercantile houses in Charlestown, and was one of the California pioneers in 1849. He had been for fifty years a member of twelve societies.

Col. Henry W. Wilson was next called upon, and said that the topic before the meeting is the most useful branch of study for all cultivators. It is most interesting to see how nature fertilizes a soil by returning to it the material taken from it by the growth of plants. Plaster is not a fertilizer; a fertilizer is a substance which has in it the elements that have been taken from the soil. Plaster is a negative salt, composed of sulphuric acid and lime, the two cheapest substances of their respective natures, either of which alone would destroy any crop; and yet no person could exist a year but for the presence of sulphur in the soil. Some substances which increase the productiveness of the soil act in ways not easily explained or accounted for. Plaster is such a substance; it is not plant food, but acts upon some soils either to develop or to set free the plant food by its chemical action. Phosphorus, sulphur, and nitrogen, are perhaps the most active elements of animal and vegetable life. Nitrogen exists in five or six different forms, each of which is evolved from the other by the chemical action of other elements, in the same manner that alcohol is converted into sulphuric ether by distillation in the presence of sulphuric acid, without sensible change in the acid.

In the air we breathe, nitrogen is inert and worthless; in leather

nearly so; and in animal refuse it is more or less valuable in proportion to the ease with which it is absorbed by plants. Four-fifths of the air that we draw in at every breath is nitrogen, and three per cent of all flesh is composed of the same element, in different forms, and it is also found in decomposing animal matter. When vegetables decay, the nitrogen that they contain immediately becomes suitable to support other vegetable life, but that from decaying animal substances is not fitted to support other animal life until it has been through certain organic changes, that are wrought by vegetable life. These changes require the presence of some alkaline salt, such as potash, soda, or lime. Lime is the cheapest, but some forms of potash would make better fertilizers with the nitrogen than lime or plaster. One object of these meetings is to encourage the study of these subjects, which lie at the foundation of all fertilizing, so as to render farmers independent of the manufacturers of fertilizers, each man making his own, and making them good. The actual value of commercial fertilizers is greatly less than the manufacturer's prices. Sulphate of ammonia can be obtained at the gas works for from three to four cents per pound, and is a cheap source of nitrogen, as is also nitrate of soda. The South Carolina phosphates furnish phosphoric acid at an exceedingly low price, and the German potash salts are cheap sources of potash; and all these the farmer can get as cheap as the manufacturer. More diversity of scientific knowledge and a greater combination of gifts and experience are required in farming than in any other calling, and it pays for the farmer to acquire them. Hardly any knowledge can come amiss, except some of the modern *isms;* but nothing is so important as "gumption;" it is absolutely indispensable.

John B. Moore thought Mr. Wetherell was right in saying that the working of plaster on land is not understood. It requires a very large quantity of water to dissolve a small quantity of plaster, — ten thousand parts of water to one of plaster. A piece of land may show wonderful results from the application of plaster, but the effect will cease after a course of years.

Mr. Wetherell mentioned a farm in South Hadley where plaster had been applied for twenty successive years, and worked admirably all that time, without any indication of failure to produce a good result.

Mr. Moore said that it might last more than twenty years, but it would cease at some time. Plaster produces the best effect on

rocky, springy soils, though he had heard of its successful use on intervales; and it has little effect near the sea-shore. At his farm in Concord, the only benefit derived from it is in fixing the ammonia about manure heaps. He had been asked by dealers to take their fertilizers by the ton, on condition that he would give them certificates of the effects; but, after sending him good fertilizers and getting the certificates, they would, on the strength of them, sell to his friends what would not give them crops. He had invariably refused to test fertilizers on such conditions, and he hoped that every one present would do the same, and let them stand or fall on their own merits. He believes in every farmer mixing fertilizers for himself. But there is a difficulty in dissolving bones in sulphuric acid; a piece as large as a man's finger will not dissolve. But both bones and Carolina phosphate can be bought ground. It is necessary that farmers should understand the working of fertilizers better than they do. He has used large quantities of fertilizers, but makes but little provision to buy nitrogen, for he believes that by stirring the soil he can get it free of cost, and that the same is the case on most farms. Nitrogen produces a rank growth of leaves and stalks, but not seed; for seed we must have potash and phosphoric acid. Nitrogen is not only the most expensive but is the most soluble and volatile part of manures. To obtain the best results it should be applied at several times during the growing season. Nitrate of soda applied in the fall is wasted, being all washed away. Mr. Moore uses large quantities of steamed bones, which he gets pretty cheap. You can rub a hard bone to powder between your fingers after it has been subjected to the action of steam under high pressure. You may get little benefit from these bones the first year unless they have been dissolved, but you will get it some time.

In farming there are three points to consider: first, the soil; second, the crop; and third, the material to put on. Dr. Goessmann has lately made the first analysis of asparagus, and to his astonishment, the ash of the stalks and roots shows fifty per cent of potash, which would lead to the conclusion that a crop of asparagus must have potash in the soil. But you can get a knowledge of what food your crops require only by actual experiment and the use of a good deal of brains. He had made a good many mistakes in such experiments, but had learned as much from them as from his successes. A market gardener told him that he put a ton of superphosphate on an acre of land, and it produced no effect whatever; but

on inquiry it proved that he also put on thirty cords of manure; and you cannot pack crops thickly enough on land to take out so much plant food. The reason that market gardeners find it profitable to buy so much stable manure is that they need its mechanical action on their soils, which they cultivate year after year, supplying no decomposing vegetable matter, as is done when grass is broken up, and therefore they must supply it in stable manure, which they get cheap, and use in a half-decomposed state. Nitrogenous manures may be necessary for market gardeners or for special crops, but the speaker thought they were not very essential in general farming.

E. W. Wood said that while all are interested in fertilizers, there is a great diversity of opinion in regard to them. Hardly any market gardeners use commercial fertilizers, though Peter Henderson recommends a partial use of them. Market gardeners want a sure thing, and they know from experience that they can depend on stable manure. There is no business in which so much fraud has been practised as in commercial fertilizers, in the last twenty-five years. These are most contemptible frauds. Professor Mapes analyzed a fertilizer which was sold for $52.50 per ton, and proved to be worth $57, but analysis in later years showed a gradual deterioration, until it was worth only seven or eight dollars, though the selling price remained the same as at first. Dr. Nichols had found not one pure sample in four, and recommended farmers to buy only broken bones. The speaker bought some super-phosphates, and laid out his rows so as to test them, and the first year they were satisfactory, especially with corn, but the next year his crops did as well without as with phosphates. A friend told him that he thought he could get a good fertilizer from a firm in Boston, who furnished materials which they knew to be good, and had them mixed in New York, and Mr. Wood bought a few barrels, and his friend bought three tons, at $52.50 per ton, but neither found any benefit from its use. The Boston firm afterwards returned to the buyer of the three tons a check for the amount paid them, and informed him that they had ascertained that the mixers sold the good materials furnished them and substituted peat, adding something to make it smell like a fertilizer. Mr. Wood suggested that to avoid fraud the manufacture of fertilizers should be conducted under the care of the State. In the town of Sutton the farmers used commercial fertilizers one year with such good results that the next year they paid $10,000 for them, with

no benefit. If the Agricultural College could manufacture fertilizers, or in some way assure their genuineness, it would be a great benefit to farmers.

John S. Martin said that he had used but one fertilizer, and that he gets better crops than the farmers who use only stable manure.

Mr. Wetherell said that when a fertilizer works well the first year but not afterwards, the season may have something to do with its success or failure: good brands sometimes fail to give a good crop in a bad season, and this adds to the risk of using them. It is a question whether farmers can continue to use commercial fertilizers for a series of years without stable manure. In Germany they think they can; but the speaker felt doubtful of it, and advised to use both if possible. The statement of Mr. Martin was a very interesting one. The land where Mr. Wetherell's father used plaster to so much advantage was high, springy land, — good corn land. He and Mr. Lothrop, of South Hadley, used it on the intervale of the Connecticut river; the latter on a pasture where twelve acres gave sufficient feed for twelve short-horn cows. It produces an action in the soil which neither ancient nor modern chemistry explains. He had heard one man speak of good action from sulphuric acid applied to the soil. He knows salt to be a fertilizer.

Col. Wilson suggested to those who buy large quantities of stable manure the question whether they get its whole value. It is subject to saturation with water, and to loss of the liquid portion, which is everywhere recognized as containing the greater part of the valuable elements. When the drainage of manure is used three times as great results have been realized as when only the solid portion was saved. An excellent way to apply it is by underground irrigation. Its use is common in Europe.

There is no household but accumulates some bones during the year, but, if we attempt to dissolve them, the fatty matter resists the action of acid, and they must be burnt; but in doing this they lose their nitrogen. If first moistened with water and then mixed with sulphuric acid diluted with four or five parts of water, burnt or ground bones can be dissolved, and form a soluble phosphate of lime. Commercial fertilizers should furnish all the elements of seeds; and these same elements enter into the composition of the brains, and flesh, and frame of man. But what would a plant be without stem and leaves? We want a perfect fertilizer to make not only seeds but leaves and trunk, just as much as we want vig-

orous lungs and limbs in man. Every cluster of grapes on a vine must have a leaf opposite to it in order to secure its perfect development. Nitrogen enters into the composition of seed, and into the cellular structure of plants, — every cell is enveloped in a tissue or husk composed of nitrogen; consequently, plants must be furnished with nitrogen, from some source, to perfect either the stem or seed. No fertilizer will work continuously and successfully unless all the elements are provided.

Mr. Moore thought that Col. Wilson had misunderstood him in regard to the necessity of supplying nitrogen to plants. The actual experience of a large number of the best farmers in the United States proves that if they furnish their plants with potash and phosphates they get better results than if they pay their money for nitrogen. Nothing makes a plant grow faster than nitrogen. Nitrate of soda applied to a lawn acts very quickly, and gives a peculiar green to it; but it must be applied when the grass is making a vigorous growth, or is about to. On a bare soil three tons were, supplied when seeded down in autumn, without producing any effect.

Col. Wilson spoke of the excellent effect of coal ashes in extracting nitrogen from filthy water. When used as a filter alternately the organic matter is retained and subjected to the beneficial action of the atmosphere. The nitrogen changes first into ammonia, then into nitric acid, and then into nitrates in combination with alkalies, which wash away. This explains the action of nitrate of soda, which, being perfectly soluble, will pass away in the ground waters, unless it can be at once absorbed by the living vegetable organism.

This being the last meeting for discussion, of the season, the President congratulated the Society on the admirable manner in which the Committee on Discussions had done their work, especially in arranging for papers and discussions on points which we know little about.

On motion of E. W. Wood, it was voted that the thanks of the Society be presented to the Committee on Discussions for their successful labors during the season.

The meeting then adjourned without day.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1884.

PART II.

BOSTON:
PRINTED FOR THE SOCIETY.
1885.

ARNOLD ARBORETUM

TRANSACTIONS

OF THE

Massachusetts Horticultural Society,

FOR THE YEAR 1884.

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TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

BUSINESS MEETING.

SATURDAY, April 5, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The Secretary presented circulars and tickets, received from the Imperial Russian Horticultural Society, for the members appointed on the 10th of February, 1883, as delegates to the International Horticultural Exposition, in commemoration of the twenty-fifth anniversary of that Society, at St. Petersburg, May 16–28.

Also a proclamation by the Governor of Nebraska, appointing Wednesday, the 16th instant, as "Arbor Day," for planting trees in that State.

Edward L. Beard, Chairman of the Committee of Arrangements, moved that the Rose and Strawberry Exhibition, appointed for June 24, be kept open for two days. The subject was referred to the Committee of Arrangements.

Mr. Beard also moved that the sum of $125 be appropriated for additional gratuities at that exhibition, which motion was referred to the Executive Committee.

E. W. Wood, from the Committee appointed at the Meeting for Discussion, December 29, 1883, to report a list of the best hardy roses for general cultivation, presented the following report, which was accepted: —

LIST OF THE BEST HARDY ROSES AS CONTINUOUS BLOOMERS FOR OUT-DOOR CULTURE, AND OF THE BEST HARDY ROSES ADAPTED TO GENERAL CULTIVATION.

Continuous Bloomers.

Alfred Colomb,
Annie Wood,
Boieldieu,
Caroline de Sansal,
Fisher Holmes,
François Michelon,
Gen. Jacqueminot,
Marie Baumann,
Mme. Victor Verdier,
Mons. E. Y. Teas,
Pierre Notting,
Rev. J. B. M. Camm,
Xavier Olibo,
*Charles Darwin,
*Countess of Oxford,
*Dr. Sewell,
*Marguerite de St. Amande,
*President Thiers.

The last five (marked with stars) are fine, constant bloomers, but liable to mildew.

Hardy Roses for General Cultivation.

Alfred Colomb,
Anna de Diesbach,
Annie Wood,
Baron de Bonstetten,
Baroness Rothschild,
Charles Lefebvre,
Duke of Edinburgh,
Étienne Levet,
Fisher Holmes,
François Michelon,
Gen. Jacqueminot,
John Hopper,
Jules Margottin,
La Rosière,
Marie Baumann,
Marquise de Castellane,
Maurice Bernardin,
Mme. Gabriel Luizet,
Mme. Hippolyte Jamain,
Mme. Victor Verdier,
Mons. Boncenne,
Mons. E. Y. Teas,
Paul Neyron,
Rev. J. B. M. Camm,
Thomas Mills,
*Louis Van Houtte,
*Mlle. Marie Rady,
*Pierre Notting.

The last three (marked with stars) are difficult and uncertain, but so remarkably fine that the Committee could not refrain from mentioning them.

JOHN B. MOORE,
Chairman of Committee.

Adjourned to Saturday, May 3.

BUSINESS MEETING.

SATURDAY, May 3, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

The President, as Chairman of the Executive Committee, reported a recommendation that the Society appropriate $150 for additional gratuities for roses at the Rose and Strawberry Exhibition in June. The report was accepted, and, agreeably to the Constitution and By-Laws, was laid over to the meeting on the first Saturday in July.

A letter was read from ex-President Marshall P. Wilder presenting to the Society a set of the "Gardeners' Gazette," in five folio volumes, London, 1837–1841, and on motion of Leander Wetherell the thanks of the Society were voted to Mr. Wilder for this valuable gift to the library.

The following named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society: —

THOMAS M. FERGUSSON, of Philadelphia, Pa.
S. EDWIN TOBEY, of Malden.
J. P. B. HENSHAW, of Boston.
WILLIAM ALBERT MANDA, of Cambridge.
Miss CAROLINE WELLINGTON, of East Lexington.
LABAN PRATT, of Dorchester.
WARREN H. MANNING, of Reading.
DAVID FISHER, of Newport, R.I.
JAMES METIVIER, of Cambridge.
ALEXANDER MESTON, of Andover.
JOSEPH TILLINGHAST, of New Bedford.
CLARENCE F. BOYNTON, of Taunton.
CLIFTON H. PAIGE, of Dorchester.
CHARLES H. STEARNS, of Brookline.

Christopher Minot Weld, of Jamaica Plain, was proposed by C. M. Atkinson as a Life Member of the Society; and F. H. Temple, of Somerville, by J. H. Woodford, as an Annual Member.

Adjourned to Saturday, June 7.

BUSINESS MEETING.

SATURDAY, June 7, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. FRANCIS B. HAYES, in the chair.

Edward L. Beard moved that an additional appropriation of $25 be made for gratuities at the Rhododendron Show, which was referred to the Executive Committee.

The President congratulated the Society on having obtained a partial exemption of its property from taxation, and said that this was chiefly due to the efforts of William H. Spooner, without which he did not think the attempt would have met with any success.

The meeting was then dissolved.

BUSINESS MEETING.

SATURDAY, July 5, 1884.

A duly notified stated meeting of the Society was holden at 11 o'clock, President HAYES in the chair.

The recommendation of the Executive Committee, that $150 be appropriated for additional gratuities at the Rose Show was taken from the table and unanimously confirmed by the Society.

The President inquired of the Chairman of the Committee of Arrangements the result of the Rose and Strawberry Show; and Mr. Beard replied that the receipts were $415, against $260 last year, and would doubtless have been considerably increased but for the unpleasant weather on the second day. The feasibility of holding the show two days was fully proved. A large number of tickets were distributed among school children, most of which were used, and the speaker was struck with the interest shown by them, and gratified by the prospect that the coming generation will be interested in horticulture. The show was admitted to be

the best ever made by the Society, and it was hoped that another year, with more favorable weather, it would be still better in every respect.

Adjourned to Saturday, July 12.

BUSINESS MEETING.

SATURDAY, July 12, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President BENJAMIN G. SMITH in the chair.

The Chairman presented, in the name of Hon. Marshall P. Wilder, President of the American Pomological Society, four copies of the "Proceedings" of that society at their session in Philadelphia, in September, 1883. On motion of Charles N. Brackett, the thanks of the Society were unanimously voted to Mr. Wilder for his donation.

Adjourned to Saturday, July 19.

BUSINESS MEETING.

SATURDAY, July 19, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, President HAYES in the chair.

The President, as Chairman of the Executive Committee, to which was referred the subject of contributing to the World's Fair at New Orleans, reported, recommending that this Society give public notice that it will receive contributions of horticultural and floricultural productions from any part of the State, to be forwarded at the expense of the Society; and that an appropriation of $100 be made to cover such expense; also that a committee of three be appointed, whose duty it should be to receive, pack, and forward such products.

The report was accepted, and the President appointed, as the Committee therein provided for, E. W. Wood, William H. Spooner and Robert Manning.

The Secretary read a letter from Mons. A. Héron, president of the Société d'Horticulture du Departement de la Seine-Inférieure, inviting this Society to send delegates and fruits to a Congress and Exposition of Fruits to be held at Rouen from the 2d to the 12th of October. It was voted to accept this invitation, and that the Committee on the New Orleans Exposition have charge of this also. Dr. Henry P. Walcott was appointed a delegate to the Congress, with power to appoint a substitute in case he should be unable to attend.

The President reported that the Executive Committee had approved the appropriation of $100 for gratuities for plants and flowers during the winter months, and of $25 for gratuities at the Rhododendron Show.

The Secretary presented, in behalf of Hon. Marshall P. Wilder, a photograph from an engraving of the great grape vine of Santa Barbara, Cal., for which the thanks of the Society were voted.

The following-named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society: —

Christopher Minot Weld, of Jamaica Plain.
Stephen N. Gifford, of Duxbury.
Theodore M. Clark, of Newtonville.

Adjourned to Saturday, August 2.

BUSINESS MEETING.

Saturday, August 2, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, Hon. Francis B. Hayes, in the chair.

Agreeably to the Constitution and By-Laws, the President reported the following Committee to nominate suitable candidates for the various offices of the Society for the year 1885: William C. Strong, *Chairman;* Henry P. Walcott, William H. Spooner, George Hill, Charles N. Brackett, John G. Barker, Charles F. Curtis.

FELKER L. TEMPLE, of Somerville,

having been recommended by the Executive Committee, was, on ballot, duly elected a member of the Society.

Adjourned to Saturday, September 6.

BUSINESS MEETING.

SATURDAY, September 6, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

William C. Strong, Chairman of the Committee appointed at the last meeting to nominate candidates for officers and standing committees of the Society for the next year, reported a printed list, which was accepted and laid on the table. It was voted that the Committee be continued and requested to nominate candidates in place of any who might decline before the election.

The Librarian placed upon the table a work on the Culture of Cider Apples and the Manufacture of Cider, presented by Charles Joly, of Paris, a Corresponding Member of this Society, and the thanks of the Society were voted to M. Joly for this and many other donations to the library, and for his services in advancing the interests of the Society in other ways.

Adjourned to Saturday, September 13.

BUSINESS MEETING.

SATURDAY, September 13, 1884.

At the adjourned meeting to-day, Vice-President C. H. B. Breck was in the chair, but no quorum was present, and the meeting was dissolved.

BUSINESS MEETING.

SATURDAY, September 20, 1884.

A special meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

The Chairman spoke of the great loss sustained by the Society in the death of the President, Hon. Francis B. Hayes, and said that this informal meeting was called to consider what action should be taken thereon.

On motion of Edward L. Beard, amended by Col. Henry W. Wilson, it was voted that the Flower Committee, William H. Spooner, Patrick Norton, F. L. Harris, James Cartwright, Edward L. Beard, Joseph H. Woodford, and David Allan, together with C. M. Atkinson, be appointed to decorate the chancel of King's Chapel on the occasion of the obsequies of Mr. Hayes.

On motion of Col. Wilson, seconded by Benjamin G. Smith, the following Committee was appointed to make other arrangements on the part of the Society in reference to the obsequies: William C. Strong, Col. Henry W. Wilson, Benjamin G. Smith, Leander Wetherell, and Robert Manning.

On motion of Benjamin G. Smith, the ex-Presidents, Hon. Marshall P. Wilder, Charles M. Hovey, James F. C. Hyde, William C. Strong, Francis Parkman, and William Gray, Jr., were appointed a Committee to prepare resolutions expressive of the sense of the Society on the death of President Hayes.

The Chairman spoke of the deep interest felt by President Hayes in the welfare of the Society, and said that, under his judicious and energetic management, its financial condition had been greatly improved and its prosperity increased. His last request was that he should be laid in the Cemetery of Mount Auburn, which was established by the Society.

At the stated meeting of the Society on the 4th of October, it was voted that the proceedings of this meeting be confirmed, and that the minutes thereof be entered with the records of the Society in their proper place.

Adjourned.

BUSINESS MEETING.

SATURDAY, October 4, 1884.

A stated meeting of the Society, being the annual meeting for the choice of officers, was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

In the absence of the Recording Secretary, Col. Henry W. Wilson was chosen Recording Secretary *pro tem.*

On motion it was

Voted, That the proceedings of the Special Meeting of the Society which was held on Saturday, September 20, be confirmed, and that the minutes thereof be entered with the records of the Society in their proper place.

Voted, That the Committee appointed at that meeting to prepare resolutions in memory of our late President be requested to present their report before proceeding to other business.

Hon. Marshall P. Wilder then presented the report of the Committee, which was read by the Secretary, as follows: —

The Committee appointed to report resolutions on the death of the Hon. Francis B. Hayes, late President of the Society, respectfully submit the following: —

Resolved, That the members of this Society deeply deplore the afflictive providence which has removed the President of this institution, the Hon. Francis B. Hayes, in the full maturity of manhood, from the field of his useful and honorable labors in our behalf, and at a time when his services were so highly appreciated, and when his efforts for the prosperity and elevation of this Society were producing such beneficial and happy results.

Resolved, That the deceased, by his extensive collection of trees and plants, his large contributions to our exhibitions, his constant attendance at our meetings and discussions, his wise counsel in the administration of our financial affairs, and his lively interest in the promotion of rural adornment and the pleasures of rural life, will ever be gratefully remembered in the history and progress of our association.

Resolved, That in the sudden removal of our late President we recognize the hand of an overruling Providence, to which we

reverently bow, whose goodness in the past we gratefully acknowledge, and whose wisdom we cannot doubt, and we hereby tender our sympathies to his bereaved family in this hour of their affliction.

Col. Wilder made some impressive remarks on the reading of the report, and appropriate remarks were also made by ex-President Strong, Rev. A. B. Muzzey, Col. H. W. Wilson, and the Chairman of the meeting; and the resolutions were adopted by a rising vote.

The Chair announced that the requirements of the Constitution and By-Laws in regard to notice of this meeting had been complied with, and that the first regular business would be the balloting for officers of the Society for the ensuing year.

The chairman appointed O. B. Hadwen, J. H. Woodford, and George Hill a Committee to receive, assort, and count the votes given, and report the number. He also announced that a check-list containing the names of members qualified to vote had been prepared and would be used; also that all officers were to be voted for upon one ballot.

Upon request, Section XXIX. of the Constitution and By-Laws, relating to the discontinuance of membership in consequence of non-payment of dues, was read, and at twenty minutes before twelve o'clock A.M., the polls were declared to be open for the election of officers.

While the balloting was in progress, the following named persons were elected members of the Society, upon favorable report of the Executive Committee: —

Mrs. Margaret Parker, of Wakefield.
Robert T. Jackson, of Dorchester.
Robert Petremant, of Roxbury.
Robert Farquhar, of Boston.
William J. Stewart, of Boston.
Francis Brown Hayes, of Boston.
Miss Mary L. Vinal, of Somerville.

On recommendation of the Executive Committee, it was *Voted*, That an additional sum of $100 be appropriated for the use of the Committee on Plants and Flowers.

Voted, That it be entered with the records of the Society that the agents of the Society, acting in its behalf, have suitably enclosed the lands of the Society on Bromfield and Bosworth streets, to prevent the acquisition by the public of any easement or right of way over the said premises.

On motion of Edward L. Beard it was *Voted*, That the Committee on Establishing Prizes, newly elected, be authorized to issue the Schedule of Prizes for Bulbs at once, in anticipation of the Spring Exhibition, for the information of those who may desire to compete for prizes.

On motion of Col. Wilson, it was *Voted*, That it would be gratifying to this Society if it should be stated upon the monumental tablet of our late President, Hon. Francis B. Hayes, that he was President of the Society for five consecutive years: from 1880 to 1884 inclusive. On motion of William C. Strong, it was *Voted*, That a committee of three be appointed to take such action as may be necessary to procure a portrait or bust of our late President. Mr. Strong requested that he might not be named as the chairman of the committee, and the Chair appointed Col. Henry W. Wilson, William C. Strong, and Edward L. Beard as the Committee.

The following proposals for membership were made: Lewis H. Farlow, of Newton, as Life Member, by Joseph H. Woodford; and John E. Blakemore, of Roslindale, as Annual Member, by William H. Spooner.

At twenty minutes before one o'clock P.M., all having voted who wished to, it was *Voted*, That the polls be now closed. The Committee retired, and, after counting the ballots, announced the result, as follows: —

Whole number of ballots	109
Necessary for a choice	55

And the persons having the number necessary for a choice were, agreeably to the Constitution and By-Laws, declared by the presiding officer to have a majority of votes, and to be elected Officers and Standing Committees of the Society for the year 1885.

Adjourned to Saturday, November 1.

BUSINESS MEETING.

SATURDAY, November 1, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, Vice-President JOHN B. MOORE in the chair.

The Secretary read a report from the Executive Committee recommending the following appropriations for the year 1885: —

For Prizes and Gratuities: —	
For Plants and Flowers, ...	$2,500
" Gratuities for the encouragement of the exhibition of flowers during the winter months, ...	100
" Fruits, ...	1,500
" Vegetables, ...	800
" Gardens, ...	200
Total, ...	$5,100

The Executive Committee also recommended to the various committees to reserve a reasonable amount for awards for such new and worthy productions as are not covered by the Prize-List.

The report was accepted, and, agreeably to the Constitution and By-Laws, was laid on the table until the first Saturday in January.

The Secretary read a letter from Benjamin G. Smith, declining the chairmanship of the Committee on Publication and Discussion for the year 1885, to which he had been elected, and one from William H. Spooner, declining the chairmanship of the Flower Committee for 1885. The Chairman of the meeting (being President-elect for 1885) also declined membership in the Committee on Publication and Discussion, and in the Committee for Establishing Prizes for the year 1885.

On motion of John C. Hovey, these resignations were accepted, and it was voted that a Committee of five be appointed to nominate candidates to fill the vacancies.

The Secretary stated that by the advice of the Executive Committee he had given the public notice required by the Constitution and By-Laws of a special election on Saturday, the 8th instant, at

11 o'clock, to fill the vacancy in the office of President for the remainder of the present year (caused by the death of the late President), and the vacancy in the office of Vice-President for the year 1885 (caused by the election of the same gentleman as President and Vice-President), at which all vacancies in the Standing Committees (including one in the Finance Committee for the remainder of the present year, caused by the death of Hon. Francis B. Hayes) could also be filled.

The Chair appointed the Committee to nominate candidates to fill vacancies as follows: John C. Hovey, O. B. Hadwen, Benjamin G. Smith, Francis H. Appleton, and Warren Heustis. It was *Voted*, That the names of all candidates be on one ballot.

The following-named persons, having been recommended by the Executive Committee, were, on ballot, duly elected members of the Society:

HENRY C. HUNT, of Newton.
LEWIS H. FARLOW, of Newton.
JOHN E. BLAKEMORE, of Roslindale.

Adjourned to Saturday, November 8, at 11 o'clock.

BUSINESS MEETING.

SATURDAY, November 8, 1884.

A special election was holden to-day at 11 o'clock, for the purpose of filling vacancies in the Offices and Standing Committees of the Society for the remainder of the year 1884 and for the year 1885, Vice-President JOHN B. MOORE in the chair.

The Recording Secretary stated that the requirements of the Constitution and By-Laws in regard to public notice of the meeting had been complied with.

John C. Hovey, Chairman of the Committee appointed at the last meeting to nominate candidates to fill vacancies, reported a printed list, which was accepted.

The Chair appointed a Committee to receive, assort, and count the votes given, and report the number, as follows: Robert Manning, Samuel Hartwell, and J. Allen Crosby.

On motion, it was *Voted*, That the check-list be dispensed with. The polls were opened at ten minutes past eleven o'clock A.M.,

and closed at ten minutes past twelve P.M. The Committee to count the votes reported the whole number to be 40, necessary for a choice 21, and that the persons named on the ticket presented by the Nominating Committee had that number and were chosen.

The report of the Committee was accepted, and the persons so named were declared by the presiding officer to have a majority of votes, and to be elected to the respective positions for which they had been nominated for the remainder of the present year and for the year 1885.

The Chair announced that the Special List of Prizes for Spring Flowering Bulbs at the Rose and Azalea Exhibition in March, 1885, authorized at the meeting on the 4th of October, was upon the table, and ready for distribution.

Adjourned to Saturday, December 6.

BUSINESS MEETING.

SATURDAY, December 6, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, JOHN B. MOORE, in the chair.

The Annual Report of the Committee on Plants and Flowers was read by William H. Spooner, Chairman.

The Annual Report of the Committee on Fruits was read by E. W. Wood, Chairman.

The Annual Report of the Committee on Vegetables was read by Charles N. Brackett, Chairman.

The Annual Report of the Committee on the Library was read by William E. Endicott, Chairman.

These reports were severally accepted and referred to the Committee on Publication.

The list of prizes for the year 1885, agreed on by the Committee for Establishing Prizes, was presented by the President as Chairman of the Executive Committee, with the approval of that Committee. On motion the list was laid on the table for one week, for examination by the members of the Society.

The President also reported from the Executive Committee a recommendation that the Society make the following appropriations for the year 1885: —

For the Committee on the Library for the purchase of magazines and newspapers, binding of books, and incidental expenses of the Committee, ...	$300
For continuing the Card Catalogue of Plates, .	100
For the Committee on Publication and Discussion,	200
For the expenses of the Committee of Arrangements, ...	300

Agreeably to the Constitution and By-Laws, this report was laid over until the first Saturday in January.

On motion, it was *Voted*, That the Committee for Establishing Prizes be authorized to accept any donations that may be made for special prizes, and to offer the same on the Schedule.

Edward L. Beard moved the following resolution: —

Resolved, That the Society views with regret the retirement of Mr. William H. Spooner from the chairmanship of the Flower Committee for the ensuing year. Mr. Spooner has for seven years filled this position, where his faithful attention to the exacting duties of the office has done much towards accomplishing the results attained by the Society during the time of his services, and where his courtesy and impartiality have been appreciated by exhibitors as well as by his associates. The Society also recognizes the valued assistance of Mr. Spooner in removing an onerous burden of taxation from its property. Though relinquishing his official position, the Society expresses the hope that its future interests may still have the practical assistance of Mr. Spooner's long experience and familiarity with its affairs.

Remarks were made by the President and P. B. Hovey, expressing their hearty concurrence in the resolutions, which were unanimously passed.

Adjourned to Saturday, December 13.

BUSINESS MEETING.

SATURDAY, December 13, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, JOHN B. MOORE, in the chair.

The Annual Report of the Committee of Arrangements was read by Edward L. Beard, Chairman.

The Annual Report of the Committee on Publication and Discussion was read by Benjamin G. Smith, Chairman.

Robert Manning read his annual report as Secretary and Librarian.

These reports were severally adopted and referred to the Committee on Publication.

The Schedule of Prizes for 1885, presented at the last meeting and then laid on the table for one week, came up for final action. On motion of William H. Spooner it was voted to add to the General Rules and Regulations the following: —

No premiums except those authorized by the Society shall be awarded at any exhibition.

Joseph H. Woodford moved to strike out the third special rule, adopted December 15, 1883. The motion was referred to the Committee of Arrangements, with full powers.

The Schedule of Prizes was then adopted and referred to the Committee on Publication, to be printed.

Adjourned to Saturday, December 20.

BUSINESS MEETING.

SATURDAY, December 20, 1884.

The meeting was called to order by President MOORE, and the Recording Secretary being absent, the President appointed E. W. Wood Recording Secretary *pro tem.* No quorum being present, the meeting adjourned to Saturday, December 27.

BUSINESS MEETING.

SATURDAY, December 27, 1884.

An adjourned meeting of the Society was holden at 11 o'clock, the President, JOHN B. MOORE, in the chair.

The following-named persons were proposed for membership in the Society: —

Robert McMillan, of Boston Highlands, as Annual Member, by C. M. Atkinson.

John L. Gardner, of Boston, as Life Member, by Charles S. Sargent.

Miss Annie C. Putnam, of Boston, as Annual Member, by Robert T. Jackson.

John G. Barker, Chairman of the Garden Committee, asked further time to prepare his report, which was granted.

The Committee on Publication and Discussion announced that the meetings for discussion would begin on the next Saturday, when John E. Russell, Secretary of the State Board of Agriculture, would speak on "Climate."

The meeting was then dissolved.

REPORT

OF THE

COMMITTEE ON PLANTS AND FLOWERS,

FOR THE YEAR 1884.

By WILLIAM H. SPOONER, CHAIRMAN.

The year which is now closing has been one of unusual success in the Society. Its exhibitions have been of greatly increased extent and excellence, induced in large measure by the favorable conditions of weather, and perhaps partly by the additions to our prize-list, and largely by the exertions of the Committee of Arrangements.

The first of the principal exhibitions was the

AZALEA AND ROSE SHOW.

MARCH 20 AND 21.

This was of uncommon excellence, and much larger than for several years. The exhibitors of Azaleas were Hon. Marshall P. Wilder, Hovey & Co., Anthony McLaren, and Norton Brothers. The contributions of Hybrid Perpetual Roses were made by John B. Moore & Son, Hon. Francis B. Hayes, President of the Society, John L. Gardner, and William C. Strong. Tea Roses were shown by Thomas W. Dee and Mrs. E. M. Gill. C. B. Gardiner again contributed a collection of his fine Cyclamens, and President Hayes, a collection of Heaths. Cinerarias were very good from Mrs. Mary T. Goddard. Pansies came from W. A. Bock and James O'Brien. Hyacinths were shown by Hovey & Co., John L. Gardner, and Charles H. Hovey, in marked increase over former years. The general display of spring bulbs was excellent, John

L. Gardner and Hovey & Co. being the contributors. The exhibition of Camellias was, as usual, very fine, being made by Hovey & Co. and President Hayes. Woolson & Co., of Passaic, N.J., made a very large display of Narcissus, which formed a prominent feature of the exhibition, and gave an added proof that this flower is much more extensively cultivated among amateurs and commercial florists than formerly. Orchids of remarkable merit were shown by F. L. Ames, E. W. Gilmore, H. H. Hunnewell, and David Allan, gardener to R. M. Pratt.

SPRING EXHIBITION.

May 10.

The display of Pelargoniums was very meagre. A few good Indian Azaleas were offered by Hovey & Co. and John L. Gardner. From the latter came also Tulips, and there were Pansies from Edward L. Beard and Mrs. E. M. Gill.

RHODODENDRON SHOW.

June 7.

The display of Rhododendrons was not very large. The competitors for prizes were President Hayes, John L. Gardner, Edwin Sheppard, and Benjamin G. Smith. German Iris of good quality was shown by E. Sheppard and J. W. Manning, and excellent Clematis by Joseph H. Woodford and E. Sheppard. Orchids were offered by E. Sheppard and James Cartwright. John L. Gardner exhibited fine Pelargoniums and Ericas; also a fine plant of *Azalea decora*. H. H. Hunnewell made his usual exhibition of Rhododendrons and Azaleas, which were not entered for competition. Good displays of cut flowers were made by John B. Moore & Son, B. G. Smith, Edwin Fewkes, J. W. Manning, C. M. Hovey, and Francis Parkman.

ROSE AND STRAWBERRY EXHIBITION.

June 24 and 25.

The weather last winter was quite mild, and favorable to roses, and the plants showed the beneficial results in the spring and

early summer; but after that time, July and August being very rainy, the rose, although generally fond of moisture, suffered from mildew, probably on account of the nights being unusually chilly. Although the time fixed for the show was late for some of the growers, the display was quite large and the general effect very fine. The chief exhibitors were John B. Moore & Son, John L. Gardner, John S. Richards, President Hayes, William Gray, Jr., and William H. Spooner. As no lists of the varieties shown were furnished, we are unable to give the names of those for which prizes were awarded. Special prizes of silver vases were again offered, and sharply competed for. John B. Moore & Son were, for the third time, awarded the Challenge Vase, which thereby became their property. J. S. Richards exhibited a new climbing rose, which was named by the Committee, "Boston Belle." It appears to be a hardy rose, a strong grower, and free bloomer; color, rosy crimson. The exhibition was by agreement continued during two days; but a serious objection to such an arrangement lies in the fact that many of the roses cut for the first day and kept either in cool air or on ice will not bear more than one day of exposure in the hall, and their places were consequently filled by other kinds on the second day, which would give to visitors examining them an unfair idea of the original standard of merit.

Very fine displays of Orchids were made by H. H. Hunnewell, F. L. Ames, E. W. Gilmore, and David Allan, gardener to R. M. Pratt. The last named also exhibited a very beautiful collection of Japanese Ferns. Mr. Hunnewell's exhibition of Pelargoniums was the best that has been made for many years. William C. Strong's collection of Maple foliage was very attractive.

ANNUAL EXHIBITION.

September 16, 17, 18, and 19.

The Annual Exhibition was the best and most successful for many years, the quality of the plants never having been equalled. The arrangement was similar to last year's, which was admirably adapted for the best effect. The greenhouse and stove plants of Messrs. Ames, Hunnewell, Pratt, Payson, and Hovey were of the choicest kinds, and most skilfully arranged. The displays of cut flowers for the prizes were remarkably good, and well kept during

the entire show. The contributions of miscellaneous flowers were much less than for several years, the dry weather of the preceding weeks no doubt affecting this display. E. D. Sturtevant, of Bordentown, N.J., was again an exhibitor of his very beautiful collection of Water Lilies, which was one of the most interesting features of the show.

William C. Strong displayed the following list of beautiful foliaged deciduous trees and shrubs, which are hardy in New England: —

LIGHT COLORS.

Cornus Sibirica variegata,
" " *elegantissima*,
" *mascula variegata*,
Salix regalis,
Variegated Woodbine,
" Sycamore Maple.

GOLDEN COLORS.

Ligustrum robustum marginatum aureum,
Ulmus Wredei,
Sambucus nigra aurea,
Populus aurea Van Geerti,
Spiræa aurea,
Catalpa aurea,
Fraxinus aurea,
Lonicera aurea reticulata,
Acer marginatum aureum.

DARK COLORS.

Prunus Pissardi,
Purple Barberry,
" Hazel,
" Beech,
" Birch,
" " Poplar Leaved,
Maple, Reitenbach's,
" Schweidler's,
" *atrosanguineum*,
Maple *Colchicum rubrum*,
" *dissectum*,
" Purple Sycamore.

CRIMPED OR CUT LEAVED.

Wier's Cut Leaved Maple.
Alnus asplenifolia,
Fagus laciniata,
Rhus "
Betula "

FINE AND GRACEFUL.

Tamarix plumosa,
" *Germanica*,
" *Indica*,
Glyptostrobus Sinensis pendula,
Cupressus distichum,
Spiræa Thunbergii,
Sophora Japonica,
Gleditschia triacanthos,
Salix Wisconsin pendula,
" *vittellina Butz*.

BROAD AND LUXURIANT.

Phellodendron Amurense,
Rosa rugosa,
Juglans nigra,
Ailanthus glandulosa,
Mahonia aquifolia,
Kalmia latifolia,
Salisburia adiantifolia,
Salix laurifolia.

The first and second Hunnewell Premiums for Evergreen Shrubs were awarded to W. C. Strong for the following: —

Abies excelsa inverta,
" *excelsa Clanbrasiliana*,
" *cœrulea*,
" *aurea*,
" *excelsa conica*,
" *Canadensis*,
" *Baretti*,
" *Menziesii*,
" *pyramidalis*,
Picea pungens,
" *pectinata*,
" *Nordmanniana*,
Pseudotsuga Douglasii,
Pinus Austriaca,
" *Cembra*,
" *sylvestris*,
Taxus baccata,
" *elegantissima aurea*,
Retinospora plumosa,
" " *aurea*,
" *pisifera*,
Retinospora pisifera aurea,
" *squarrosa*,
" " *Veitchii*,
" *filifera*,
" " *aurea*,
" *obtusa nana*,
" " " *variegata*,
" *lycopodioides*,
" *ericoides*,
Juniperus Hibernica,
" *venusta*,
Thuja occidentalis variegata,
" *Lobbii*,
" *filifera*,
" *pyramidalis*,
" *compacta*,
" *aurea*,
" *Sibirica*,
" *densa*.

Stove and Greenhouse Plants. — The first prize for twelve of different varieties was awarded to F. L. Ames, for

Alocasia macrorhiza variegata,
Anthurium Veitchii,
" *Warocqueanum*,
Asparagus plumosus nanus,
Croton Queen Victoria,
Dieffenbachia Bausei,
Dracœna Lindeni,
Kentia australis,
Maranta Makoyana,
" *zebrina*,
Phyllotœnium Lindeni,
Sphœrogyne latifolia.

Specimen Flowering Plants. — The first prize for six named varieties was awarded to David Allan, gardener to R. M. Pratt, for

Clerodendron Balfourianum,
Curcuma Roscoeana,
Dipladenia Boliviensis,
Dipladenia profusa,
Grevillea Preissii,
Nerine corusca.

For a single named Specimen Flowering Plant, David Allan was also first with *Anthurium Andreanum*.

VARIEGATED LEAVED PLANTS. — The first prize for six was given to H. H. Hunnewell, for

Alocasia Putzeysi (new), *Dieffenbachia Baraquiniana*,
Ananassa sativa fol. var., " *magnifica* (new),
Colocasia Neo-Guineensis (new) ,*Maranta fasciata*.

The first prize for a single specimen variegated leaved plant was given to David Allan, for Croton Queen Victoria.

CALADIUMS. — The first prize for six named varieties was awarded to David Allan, for

Carnatum, *Comtesse de Maillé*,
Mons. A. Hardy, *Candidum*,
Albo-luteum, *Teniers*.

And the second to the same for

Cyphel, *Reine de Portugal*,
Mad. Fritz Kœchlin, *Sanchoniathon*,
Mad. Marjolin Scheffer, *Sirius*.

ADIANTUMS. For six named varieties, the first prize was given to David Allan, for

A. concinnum latum, *A. formosum*,
A. cuneatum, *A. gracillimum*,
A. Farleyense, *A. trapeziforme*.

For a TREE FERN, David Allan was first with *Alsophila capensis*.

For LYCOPODS, four named varieties, the first prize was taken by David Allan with

L. densum, *L. variabilis*,
L. hæmatodes, *L. Wildenovii*.

For DRACÆNAS, H. H. Hunnewell was first, but no list was furnished.

For CROTONS, six varieties, David Allan was first with

C. Evansianus, *C. aureo-maculatus*,
C. Mortii, *C. Williamsii*,
C. nobilis, *C. variegatum*.

For a PALM, single specimen, the first prize was given to David Allan, for *Areca lutescens*.

For NEPENTHES, three named plants, the first prize was taken by F. L. Ames with *N. Mastersiana*, *N. Chelsoni*, and *N. Rafflesiana*.

AGAVES. — Six distinct named varieties were shown by C. M. Hovey, and took the first prize, as follows: —

A. applanata,	*A. Gilbeyi*,
A. cyanea,	*A. filifera nana*,
A. Ghiesbreghtii,	*A. heteracantha cærulea*.

For ORCHIDS, three varieties in bloom, F. L. Ames took the first prize with *Cypripedium Dominii*, *Odontoglossum grande*, and *Dendrobium Dearei;* and the second with *Dendrobium formosum giganteum*, *Epidendrum prismatocarpum*, and *Pilumna fragrans*.

For a single plant in bloom, H. H. Hunnewell was first with *Cattleya Dowiana aurea*.

CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

We considered last year's exhibit far in advance of any previous efforts of the Society in this department, but the display of this season was even better; in fact the Upper Hall was not large enough, although it was used exclusively for this purpose. The exhibitors of plants were John L. Gardner, Dr. H. P. Walcott, E. W. Wood, Hon. Marshall P. Wilder, James O'Brien, C. M. Hovey, Norton Brothers, and Delay & Meade. Cut flowers were shown by Edwin Fewkes, Dr. H. P. Walcott, E. W. Wood, E. Sheppard, Mrs. Francis B. Hayes, and P. Malley.

John L. Gardner was first with six Large Flowered specimens, as follows: —

Christine,	Pink of Pearl,
Golden Beverley,	Prince of Wales,
Mrs. Forsythe,	Progne.

Also for six Japanese with:

Bouquet Fait,	Grandiflorum,
E. G. Eguileor,	Hiver Fleuri,
Fair Maid of Guernsey,	Meteor.

For a specimen plant, Large Flowered, H. P. Walcott was first with Crimson King, and second with Golden Queen of England. E. W. Wood was third with John Salter.

For a specimen plant, Japanese, John L. Gardner was first with La Charmeuse. H. P. Walcott was second and third with President Parkman and Cossack.

For a specimen plant, Pompon, John L. Gardner was first with Amphilla, E. W. Wood second with Golden Circle, and Dr. Walcott third with Mr. Astie.

Edwin Fewkes contributed a very choice collection of cut Japanese Chrysanthemums of new kinds. He also showed the following named varieties:—

Large Flowered or Chinese.

Antonelli,
Barbara,
Baron Beust,
Beethoven,
Dr. Rozas,
Duchess of Connaught,
Empress of India,
Fingal,
Guernsey Nugget,
Jardin des Plantes,
John Salter,
King of Crimsons,
Lord Derby,
Lord Wolseley,
L'Orient,
Mabel Ward,
Mrs. Dixon,
Mrs. G. Rundle,
Nil Desperandum,
Pink Perfection,
Prince of Wales,
Prince Victor,
Venus,
White Eve.

Pompons.

Amphilla,
Anais,
Antonius,
Brilliant,
Elegant,
Fanny,
Gen. Canrobert,
Golden Cedo Nulli,
Golden Circle,
La Fiancée,
May Hardwick,
Mlle. Marthe,
Perfection,
Perle des Beautés,
Pet,
Snowdrop,
Stella.

Japanese.

Abd el Kader,
Beauté de Toulouse,
Bend Or,
Bras Rouge,
Cité des Fleurs,
Dr. Masters,
Elise,
Fulton,
Grandiflorum,
Julius Scharff,

L'Incomparable,	Oracle,
Mandarin,	Père Délaux,
Margot,	Sol,
Mme. C. Audiguier,	Soleil Levant,
Mons. Lemoine,	Tokio.
Mrs. Charles Carey,	

Dr. Walcott showed a seedling Chrysanthemum, Nevada (1 — A 10); color, pure white; also seedling yellow varieties, John Thorpe and A 1. Excellent seedlings were also shown by Arthur H. Fewkes, viz.: Large Flowered, Nos. 1, 7, and 12; Anemone Flowered, No. 8; Japanese, Nos. 5, 13, and 14; 13 being a very good white. John Thorpe, of Queens, Long Island, also contributed some very good seedling Chrysanthemums. A First Class Certificate of Merit was awarded to him for the following named seedlings: Mrs. Gubbins, Dr. H. P. Walcott, Dr. Hogg, and John W. Chambers.

The fine collection of Orchids and other plants, filling a table, was an excellent adjunct to this beautiful display. They were contributed by E. W. Gilmore, H. H. Hunnewell, David Allan, and the Cambridge Botanic Garden.

MISCELLANEOUS EXHIBITS.

The weekly exhibitions have been of unusual interest, and better than for several years, the variety and quality of the flowers shown being remarkably fine, and the number of contributors larger than previously. President Francis B. Hayes presented during the winter months large collections of Camellias, and William C. Strong offered remarkably fine Hybrid Roses, among them that excellent new variety, Heinrich Schultheis, of a delicate pinkish-rose color, and sweet-scented. John B. Moore & Son also exhibited admirable Hybrids, including the beautiful new white, Merveille de Lyon, color pure white, sometimes shading into rose, of very large globular form, with petals of great substance. This rose appears to be the coming favorite, as we notice it in almost all the English exhibitions as one of the prize varieties. Messrs. Moore also exhibited the new White Baroness, a white sport from the Baroness Rothschild. From Jackson Dawson came three Hybrid Roses worked upon the Japan stock, in remarkable vigor of growth, and full of flowers, though the latter were not of very

large size. E. M. Wood & Co. again presented some of their wonderful blooms of Maréchal Niel roses.

From F. L. Ames, February 9th, came a beautiful collection of Orchids, among which was the *Dendrobium Ainsworthii.*

February 28th, President Hayes exhibited *Rhododendron Veitchianum*, color pure white; also *R. Veitchianum lævigatum*, pure white, with serrated petals, and very sweet.

April 19th, from N. S. Simpkins, came twelve blooms of the Cornelia Cook rose. These were truly splendid flowers and never before equalled in our halls.

May 3d, we had from David Allan seedling Auriculas; the first time so well shown.

July 12th, Francis Parkman brought seedlings from *Iris Kœmpferi*, which were the finest of these beautiful flowers that he has ever shown. From David Allan came the beautiful *Dendrobium Dearei*, color white, and one of the finest orchids of recent introduction. It is said that the flowers have been known to last three months.

July 26th, Hon. Marshall P. Wilder offered blooms of the new rose raised by Ellwanger & Barry, and named Marshall P. Wilder. We should judge it might be a seedling from François Michelon. It is a strong grower, hardy, and a very free bloomer, flower well-formed and fragrant, of a cherry-carmine color. C. M. Hovey presented *Statice Suworowi.*

Hollyhocks. — The display, though large in numbers, has not been as good as in former years. The chief contributors were Edwin Fewkes, Miss E. M. Harris, John S. Richards, Mrs. E. M. Gill, and Mrs. A. D. Wood. From L. H. Farlow came a fine group of single varieties, and from Charles F. Curtis a remarkably good dark kind.

From Robert T. Jackson, August 2, came *Campanula cæspitosa*, from the Swiss Alps, which, he says, is "An Alpine species of great beauty. It grows abundantly on all the higher Alps of Switzerland, where it was collected August, 1883. It is remarkably free blooming, and it has a long season of bloom, some of the plants exhibited having had flowers on them since July 5. It will probably prove hardy here, as it is in England." Also, from the same, a beautiful collection of Ferns of New England and Old England, embracing fifty-three species and eleven varieties. Mr. Jackson said of them: "With the exception of the three dried specimens, all the fronds are cut from plants under

cultivation, and mostly in the open border. Some, however, require the protection of a cold-frame in winter time. The ferns are arranged in three divisions, according as they inhabit New England, England, or both places."

NATIVES OF NEW ENGLAND.

Adiantum pedatum,
Aspidium acrostichoides,
" " var. *incisum*,
" *Bootii*,
" *Goldianum*,
" *marginale*,
" *Noveboracense*,
Asplenium angustifolium,
" *ebeneum*,
" *montanum* (?)
" *thelypteroides*,
Botrychium Virginicum,
Camptosorus rhizophyllus,
Cystopteris bulbifera,
Dicksonia pilosiuscula,
Lygodium palmatum,
Onoclea sensibilis,
" *Struthiopteris*,
Osmunda cinnamomea,
" *Claytoniana*,
Pellæa atropurpurea,
" *gracilis*.
Phegopteris hexagonoptera,
Woodsia obtusa,
Woodwardia Virginica.

NATIVES OF ENGLAND.

Allosorus crispus,
Aspidium angulare,
" " two vars.
" *Lonchitis*,
" *rigidum*,
Asplenium Adiantum-nigrum (dried specimen),
Asplenium fontanum,
Asplenium septentrionale,
Ceterach officinarum,
Cystopteris montana,
Hymenophyllum Tunbridgense (dried specimen),
Lomaria spicant,
Trichomanes radicans (dried specimen).

NATIVES OF BOTH NEW ENGLAND AND ENGLAND.

Aspidium aculeatum,
" *cristatum*,
" *Filix-mas*,
" " var.
" *spinulosum*,
" " var. *dilatatum*,
Aspidium Thelypteris,
Asplenium Felix-fœmina,
" " four vars.
" *Ruta-muraria*,
Asplenium Trichomanes,
" *viride*,
Cystopteris fragilis,
Osmunda regalis,
Phegopteris Dryopteris,
" *polypodioides*,
Polypodium vulgare,
Pteris aquilina,
Scolopendrium vulgare,
" " two vars.
Woodsia Ilvensis.

Edwin Fewkes exhibited the new *Tigridia pavonia alba*, color white.

Native Flowers. — Large collections have been presented during the season by Mrs. P. D. Richards, whose exhibits have been well arranged under their botanical names, reflecting great credit on her industry and care as a collector. She has exhibited one hundred and forty-two different species, thirty-two of which were new, besides ferns. Among the rarities were

Drosera filiformis,
Habenaria blephariglottis,
Lycopodium inundatum,
Solidago tenuifolia,
Triglochin palustre.

September 6th she presented a pretty specimen of the rare *Typha angustifolia*, or Small Cat-tail.

Large contributions have been made by Mrs. A. J. Dolbear under name; also by E. H. Hitchings, together with fine displays from R. B. Cummings. All these contributions have added interest and instruction to the weekly shows, and are deserving of increased encouragement.

D. Zirngiebel has several times shown his seedling White Aster, a cross between Aster Truffaut and A. Victoria, which appears to be a very good flower.

Gladioli. — The prizes brought out some remarkably good kinds. The exhibits of W. T. Merrifield and Mrs. T. L. Nelson and F. Bacheller were very choice. In Mr. Merrifield's collection were the following: —

Addison,
Circe,
Giganteus,
John Bull,
Leander,
Leda,
Lord Byron,
Norma,
Princess Clotilde,
Princess Mary of Cambridge,
Stella,
Vesta,
Victory,
Virginalis.

William E. Endicott exhibited seedling gladioli, crosses of *Gandavensis* and *purpurea*, which he names and describes as follows: —

Condesa. — Flower very large and open, nearly circular in out-

line; color rosy-purple, with a violet carmine stain on the lower petal.

Corporal. — Long spike; flowers closely set; color rosy-purple; the three lower divisions marked with oval crimson blotches, edged with bright yellow crescents.

August 23, Seedling Gladiolus, Woebly, was shown by James Cartwright; flower large; color a very bright cherry cardinal; the edges of the petals striped darker, the throat of the three lower divisions white with a pink stripe through the centre, a white line running through the upper divisions; a strong spike.

The Perpetual Moss Rose, Salet, was shown for several weeks in succession by W. H. Spooner, and has proved a true perpetual and a very desirable Moss Rose.

August 30th, Daniel Duffley exhibited a collection of *Amaryllis Belladonna* in pots, in full flower, showing wonderful skill in culture. Never have there been shown in our Halls such perfect specimens of this plant, which, though not new, is difficult of culture.

Dahlias. — The display of Dahlias through the season has been quite large and the quality of the flowers much better than for several years. Robert T. Jackson contributed two seedlings, of which he says, "They were raised by Mr. John Richardson of Dorchester; one is a fine garnet-red, perfectly double, and of good form; the other combines two shades of a maroon-crimson, and is of exceedingly perfect form as well as perfectly double."

Single dahlias were shown in quantities, and are rapidly taking their place among the most popular summer flowers. E. Sheppard, Mrs. E. M. Gill, Stillman S. Hovey, Benjamin G. Smith, and C. M. Hovey were the chief contributors.

September 6th, the new Cannas from C. M. Hovey were very choice, and the spotted flowered variety quite desirable. L. W. Goodell's collection of Petunias and Dianthus was very choice.

Herbaceous Plants. — The prizes for these proved much more popular this season than the previous year, thereby increasing the value of the weekly exhibits, and proving the experiment a success. J. W. Manning and Miss S. W. Story have presented named collections nearly every week, and A. McLaren has done so several times. The best continuous exhibits having been made by J. W. Manning, the Silver Medal was awarded to him.

Prizes have been awarded from the Hunnewell Fund to the amount of $56. The special appropriation of $100 for winter exhibits has all been awarded, and is included in the list of gratuities.

The amount of money prizes and gratuities awarded is $2,065, out of the appropriation of $2,125.

All of which is respectfully submitted.

WM. H. SPOONER,
JAMES CARTWRIGHT,
E. L. BEARD,
J. H. WOODFORD,
DAVID ALLAN,
} *Committee on Plants and Flowers.*

The following letter was appended to and presented with the Report: —

MR. PRESIDENT: — With this record my official duties in the Society are closed, and not without many pleasant recollections of the courtesy manifested by those with whom I have been associated, especially by yourself, Mr. President, in the friendly relations which have uniformly existed between us.

I hope I may claim the satisfaction of leaving the Society's affairs in my department in quite as good condition as I found them, having endeavored to apply a careful judgment and economy in promoting its interests wherever I had opportunity, either within these Halls, or elsewhere.

It will be very pleasant to watch its future successes in the able hands which will now carry on the work.

WILLIAM H. SPOONER.

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

JANUARY 5.

Gratuities : —

John L. Gardner, Primulas,	$3 00
Francis B. Hayes, Camellias and Epacris,	2 00
William C. Strong, Hybrid Perpetual Roses,	2 00

JANUARY 12.

Gratuities : —

William C. Strong, Hybrid Perpetual Roses,	2 00
Francis B. Hayes, Camellias,	2 00
Edwin Sheppard, Primulas,	1 00

JANUARY 19.

Gratuities : —

Francis B. Hayes, Camellias,	2 00
William C. Strong, Hybrid Perpetual Roses,	2 00
Mrs. E. M. Gill, Cut Flowers,	1 00

JANUARY 26.

Gratuities : —

Francis B. Hayes, Camellias,	3 00
John L. Gardner, *Cœlogyne cristata*,	3 00

FEBRUARY 2.

Gratuities : —

Francis B. Hayes, Camellias,	2 00
Jackson Dawson, Hybrid Perpetual Roses,	3 00
E. M. Wood & Co., Maréchal Niel Roses,	3 00
Mrs. E. M. Gill, Cut Flowers,	1 00
S. S. Hovey, " "	1 00

FEBRUARY 9.

Gratuities : —

F. L. Ames, Orchids,	10 00
Waldo O. Ross, *Lælia anceps alba*,	2 00
Francis B. Hayes, Camellias,	3 00
W. C. Strong, Hybrid Perpetual Roses,	1 00
John L. Gardner, Epacris,	3 00
Mrs. A. D. Wood, Vase of Flowers,	1 00

FEBRUARY 16.

Gratuities : —

Francis B. Hayes, Camellias,	3 00
Mrs. A. D. Wood, Vase of Flowers,	1 00
E. Sheppard, Pansies and Clematis,	1 00

FEBRUARY 23.

Gratuities: —

Francis B. Hayes, Camellias,	$3 00
" " Azalea Kaiser Augustus,	1 00
Hovey & Co., Camellias,	2 00
John B. Moore & Son, Hybrid Perpetual Roses,	3 00
Mrs. A. D. Wood, *Freesia refracta alba odorata*,	1 00

MARCH 1.

Gratuities: —

Francis B. Hayes, Camellias,	3 00
John B. Moore & Son, Hybrid Perpetual Roses,	3 00
Mrs. E. M. Gill, Cut Flowers,	1 00
Mrs. A. D. Wood, " "	1 00
B. G. Smith, Carnations,	1 00
E. Sheppard, Clematis and Pansies,	1 00

MARCH 8.

Gratuities: —

Hovey & Co., Camellias,	2 00
John B. Moore & Son, Hybrid Perpetual Roses,	2 00
Francis B. Hayes, Display of Flowers,	2 00
Mrs. A. D. Wood, " " "	1 00

MARCH 13.

Gratuities: —

Hovey & Co., Camellias,	2 00
Francis B. Hayes, Display of Flowers,	2 00
Mrs. A. D. Wood, " " "	2 00

AZALEA AND ROSE SHOW.

MARCH 20 AND 21.

INDIAN AZALEAS. — Six named varieties in pots, Marshall P. Wilder,	$12 00
Two named varieties, in pots, Marshall P. Wilder,	8 00
Specimen plant, named, in pot, Hovey & Co., Suzette,	5 00
Four named varieties, in not exceeding ten-inch pots, Marshall P. Wilder,	8 00
Second, Hovey & Co.,	6 00
Single plant, of any named variety, in not exceeding an eight-inch pot, Anthony McLaren, Borsig,	3 00
Second, Marshall P. Wilder, Rosy Morn,	2 00
HYBRID PERPETUAL ROSES. — Three plants, in not exceeding eight-inch pots, distinct named varieties, John B. Moore & Son,	6 00
Second, Francis B. Hayes,	5 00
Single plant, of any named variety, John L. Gardner, Pierre Seletzski,	4 00

Second, John B. Moore & Son, John Hopper,	$3 00
Twelve cut blooms, of six distinct named varieties, two of each, John L. Gardner,	6 00
Second, John B. Moore & Son,	4 00
Six blooms, of four distinct named varieties, John B. Moore & Son,	3 00
Single bloom, of any named variety, John B. Moore & Son, Mad. Gabriel Luizet,	1 00
TENDER ROSES. — Twelve blooms of Catherine Mermet, Thomas W. Dee,	4 00
Second, Thomas W. Dee,	3 00
Twelve blooms of Niphetos, Mrs. E. M. Gill,	4 00
Twelve blooms of Souvenir de la Malmaison, Mrs. E. M. Gill,	4 00
ORCHIDS. — Three plants, in bloom, F. L. Ames,	8 00
Second, E. W. Gilmore,	6 00
Single plant, in bloom, H. H. Hunnewell, *Cœlogyne cristata*,	3 00
CYCLAMENS. — Six plants, in bloom, C. B. Gardiner,	6 00
Second, C. B. Gardiner,	4 00
Three plants, in bloom, C. B. Gardiner,	3 00
Second, C. B. Gardiner,	2 00
Single plant in bloom, C. B. Gardiner,	2 00
HEATH. — Single plant in bloom, Francis B. Hayes,	3 00
Second, Francis B. Hayes,	2 00
PRIMROSES. — Three plants, Single Flowered, of distinct varieties, in bloom, John L. Gardner,	2 00
CINERARIAS. — Four varieties, in not over nine-inch pots, in bloom, Mrs. M. T. Goddard,	6 00
Second, Mrs. M. T. Goddard,	4 00
Single plant in bloom, Mrs. M. T. Goddard,	3 00
Second, Mrs. M. T. Goddard,	2 00
PANSIES. — Six distinct varieties, in bloom, William A. Bock,	3 00
Fifty cut blooms, in the Society's flat fruit-dishes, W. A. Bock,	3 00
Second, James O'Brien,	2 00
HYACINTHS. — Twelve distinct named varieties, in pots, one in each pot, in bloom, Hovey & Co.,	8 00
Second, C. H. Hovey & Co.,	6 00
Third, John L. Gardner,	4 00
Six distinct named varieties, in pots, one in each pot, in bloom, John L. Gardner,	6 00
Second, Hovey & Co.,	4 00
Third, C. H. Hovey & Co.,	2 00
Three distinct named varieties, in pots, one in each pot, in bloom, John L. Gardner,	3 00
Second, Hovey & Co.,	2 00
Third, C. H. Hovey & Co.,	1 00
Single named bulb in pot, in bloom, C. H. Hovey & Co., Fabiola,	2 00
Second, John L. Gardner, Hofdyk,	1 00
Two pans, ten bulbs of one variety in each pan, John L. Gardner,	4 00

General Display of Spring Bulbs, all classes, John L. Gardner,	$10 00
Second, Hovey & Co.,	8 00
LILIES. — Display in pots, in bloom, Hovey & Co.,	8 00
LILY OF THE VALLEY. — Six six-inch pots, in bloom, Hovey & Co.,	4 00
Second, Hovey & Co.,	3 00
CAMELLIAS. — Display of named varieties, cut flowers with foliage, not less than twelve blooms, of not less than six varieties, Hovey & Co.,	4 00
Second, Francis B. Hayes,	3 00
Six cut blooms, of not less than four named varieties, with foliage, Hovey & Co.,	3 00
CUT FLOWERS. — Display in the Society's glass vases, Francis B. Hayes,	6 00
Second, Mrs. A. D. Wood,	4 00
BASKET OF FLOWERS. — Best arranged, James O'Brien,	6 00
Fourth prize, Stillman S. Hovey,	3 00

Gratuities: —

Marshall P. Wilder, Azaleas,	6 00
Anthony McLaren, Collection of Azaleas,	5 00
Norton Brothers, Azalea,	3 00
Hovey & Co., Azaleas,	2 00
John B. Moore & Son, Vase of Roses,	3 00
William C. Strong, Hybrid Perpetual Roses,	3 00
F. L. Ames, Orchids,	10 00
" " Orchid Flowers,	5 00
H. H. Hunnewell, Orchid Flowers,	10 00
David Allan, gardener to R. M. Pratt, Orchids,	10 00
Woolson & Co., Collection of Narcissus and Herbaceous Plants,	25 00
Jackson Dawson, Primroses and Polyanthus,	3 00
David Allan, gardener to R. M. Pratt, *Cytisus Everestianum*,	3 00
H. H. Hunnewell, *Glonera jasminiflora*,	3 00
Hovey & Co., Palms,	2 00
M. B. Faxon, Crotons,	1 00
Claude W. Hutlen, Cactus,	1 00
Francis B. Hayes, Display of Plants,	6 00
H. H. Hunnewell, Collection of Plants,	5 00
Hovey & Co., Plants,	3 00
Edwin Sheppard, Display of Flowers,	3 00
Mrs. E. E. Gill, " " "	3 00
Miss S. W. Story, " " "	1 00
Miss A. C. Kenrick, Basket of Mahonia,	1 00

MARCH 29.

Gratuities: —

Francis B. Hayes, Rhododendrons and Azaleas,	5 00
Hovey & Co., Camellias,	2 00
John L. Gardner, Hyacinths,	3 00

Edwin Fewkes, Sarracenias,	$1 00
Francis B. Hayes, Cut Flowers,	2 00
Mrs. A. D. Wood, " "	1 00
Mrs. E. M. Gill, " "	1 00
Stillman S. Hovey, " "	1 00

APRIL 5.

Gratuities : —

John L. Gardner, Plants,	3 00
Marshall P. Wilder, Azaleas,	2 00
Edward L. Beard, Hoop Petticoat Narcissus and New White Violet, Comte de Brazza,	2 00
Hovey & Co., Camellias,	1 00
Francis B. Hayes, Cut Flowers,	2 00
Miss S. W. Story, " "	1 00
Mrs. E. M. Gill, " "	1 00

APRIL 12.

Gratuities : —

Francis B. Hayes, Plants,	5 00
W. H. Badlam, Primulas and Violets,	1 00
W. C. Strong, Gen. Jacqueminot Roses,	1 00

APRIL 19.

Gratuities : —

W. C. Strong, Gen. Jacqueminot Roses,	1 00
Sewell Fisher, Seedling Carnations,	2 00
Francis B. Hayes, Azalea, Jules Verne,	1 00
Mrs. E. M. Gill, Display of Flowers,	1 00
Mrs. A. D. Wood, " " "	1 00

APRIL 26.

Gratuities : —

W. H Badlam, Auriculas,	2 00
Mrs. E. M. Gill, Pansies,	1 00
G. W. Sanderson, "	1 00
E. L. Beard, "	1 00
C. W. Norton, "	1 00
Mrs. E. M. Gill, Display of Flowers	1 00
Mrs. A. D. Wood, " " "	1 00
Miss S. W. Story, " " "	1 00

MAY 3.

Gratuities : —

John Mitchell, Primulas,	1 00
Mrs. E. M. Gill, Display of Flowers,	1 00
Miss S. W. Story, " " "	1 00
E. L. Beard, " " "	1 00

SPRING EXHIBITION.

May 10.

Pelargoniums.—Four named Zonale varieties, variegated, in bloom, Hovey & Co.,	$3 00
Second, Hovey & Co.,	2 00
Six named Show or Fancy varieties, in bloom, Hovey & Co.,	4 00
Indian Azalea. — Single plant, in pot, named, Hovey & Co., Baron de Lieburgh,	6 00
Second, John L. Gardner,	5 00
Third, Hovey & Co., *Delicatissima*,	4 00
Tulips. — Twenty-four blooms, distinct named varieties, John L. Gardner,	4 00
Second, John L. Gardner,	3 00
Basket of Flowers.—Miss S. W. Story,	3 00
Pansies. — Fifty cut blooms in the Society's flat fruit dishes, E. L. Beard,	3 00
Second, Mrs. E. M. Gill,	2 00
Herbaceous Plants.—J. W. Manning,	2 00
Gratuities: —	
John L. Gardner, Plants,	5 00
B. R. Freeman, Violets,	1 00
Mrs. E. M. Gill, Pansies,	1 00
Benjamin G. Smith, *Andromeda floribunda*,	1 00
George Seaverns, Hydrangeas,	1 00
Edward L. Beard, Anemones and Primulas,	1 00
W. K. Wood, Cut Flowers,	2 00
E. Sheppard, " "	2 00
Miss S. W. Story, " "	1 00
Hovey & Co., " "	1 00
Mrs. P. D. Richards, Native Flowers,	1 00

May 17.

Gratuities: —	
J. W. Manning, Herbaceous Plants,	1 00
Stillman S. Hovey, Coreopsis,	1 00
A. W. Crawford, Seedling Pelargoniums,	1 00
Miss S. W. Story, Display of Flowers,	1 00
Miss E. M. Harris, " " "	1 00
Mrs. E. M. Gill, " " "	1 00

May 24.

Gratuities: —	
W. A. Manda, Display of Hardy Flowers,	3 00
Benjamin G. Smith, Pansies,	1 00
Miss S. W. Story, Display of Flowers,	1 00
Mrs. E. M. Gill, " " "	1 00
Hovey & Co., Plants and Flowers,	2 00

RHODODENDRON SHOW.

JUNE 7.

Hunnewell Prizes.

RHODODENDRONS. — To be exhibited in Rose Boxes. Twenty-four tender varieties, named, Francis B. Hayes, ... $10 00
Six tender named varieties, " " " 3 00
Three tender named varieties, " " " 2 00
Single truss of any tender named variety, Francis B. Hayes, Lady Grenville, ... 1 00
Ten hardy named varieties, John L. Gardner, ... 6 00
Six " " " Francis B. Hayes, ... 3 00
Three " " " John L. Gardner, ... 2 00
Single truss of any hardy named variety, Francis B. Hayes, . . 1 00
HARDY AZALEAS. — From any or all classes, fifteen named varieties, one truss of each, Edwin Sheppard, ... 8 00
Six named varieties, one truss of each, Benjamin G. Smith, . . 4 00
Cluster of trusses, of one variety, Benjamin G. Smith, . . . 2 00

Society's Prizes.

GERMAN IRIS. — Twelve distinct varieties, E. Sheppard, . . 3 00
Second, J. W. Manning, ... 2 00
CLEMATIS. — Early named varieties, display of cut blooms, J. H. Woodford, ... 3 00
Second, Edwin Sheppard, ... 2 00
HARDY FLOWERING SHRUBS. — Twelve named varieties, cut blooms, Benjamin G. Smith, ... 3 00
CUT FLOWERS. — Display, filling one hundred bottles, W. K. Wood, 4 00
Second, Mrs. E. M. Gill, ... 3 00
TABLE DESIGN, other than a basket of flowers, Mrs. E. M. Gill, . 4 00
Second, Miss S. W. Story, ... 3 00
HERBACEOUS PLANTS. — J. W. Manning, ... 2 00

Gratuities: —

H. H. Hunnewell, Collection of Rhododendrons, ... 5 00
" " " Azaleas, ... 5 00
Francis B. Hayes, Rhododendrons, ... 3 00
Francis Parkman, Seedling Azaleas, ... 2 00
C. M. Hovey, Display, ... 5 00
John B. Moore & Son, Pæonies, Hybrid Perpetual Roses, and Gloxinias, ... 3 00
Benjamin G. Smith, Clematis and Pansies, ... 1 00
Edwin Fewkes, Roses and Azaleas, ... 1 00
E. Sheppard, Orchids, ... 4 00
James Cartwright, *Dendrobium densiflorum*, ... 2 00
John L. Gardner, Pelargoniums, ... 3 00
" " Ericas, ... 2 00

J. W. Manning, Pyrethrums,	$1 00
Jackson Dawson, Shrubs, Azaleas, etc.,	5 00
Francis B. Hayes, Cut Flowers,	2 00
Miss S. W. Story, " "	1 00
E. Sheppard, Display,	1 00

ROSE AND STRAWBERRY EXHIBITION.

JUNE 24 AND 25.

Special Subscription Prizes.

HYBRID PERPETUAL ROSES. — Twenty-four Roses, of different varieties, named, John L. Gardner, Silver Vase, value,	$50 00
Second, William Gray, Jr., Silver Vase, value,	30 00
Six Roses of different varieties, named, John S. Richards, Silver Vase, value,	15 00
Twelve Roses of different varieties, named, William H. Spooner, Silver Vase, value,	20 00
Eighteen Roses of different varieties, named, John L. Gardner, Silver Vase, value,	25 00
Six Roses of any two varieties, three of each, named, Francis B. Hayes, Silver Vase, value,	15 00
Eighteen Roses of six varieties, three of each, named, William H. Spooner, Silver Vase, value,	25 00
Twenty-four varieties, three specimens of each, to John B. Moore & Son, to be held for three consecutive years, this being the third year of the award, Silver Challenge Vase, value,	200 00

Special Prize, offered by a member of the Society.

HYBRID PERPETUAL ROSES. — For the best six blooms of any one variety, to be judged by *points*, William H. Spooner, Mme. Gabriel Luizet, Piece of Plate, value,	10 00

Society's Special Prizes.

HYBRID PERPETUAL ROSES. — Six blooms of Alfred Colomb, John B. Moore & Son,	4 00
Six blooms of Baroness Rothschild, John B. Moore & Son,	4 00
Six blooms of Jean Liabaud, John B. Moore & Son,	4 00
Six blooms of John Hopper, John B. Moore & Son,	4 00
Six blooms of Marquise de Castellane, John B. Moore & Son,	4 00
Six blooms of Mme. Gabriel Luizet, William H. Spooner,	4 00
Six blooms of Mme. Victor Verdier, John B. Moore & Son,	4 00
Twelve blooms of any other variety, John B. Moore & Son, Mons. Boncenne, Harris's Treatise on Insects.	
Single bloom of any variety, John B. Moore & Son, François Michelon,	3 00
Second, John B. Moore & Son, Mme. Gabriel Luizet,	2 00
Third, " " " " Alfred Colomb,	1 00

Regular Prizes.

HYBRID PERPETUAL ROSES. — Twenty-four distinct named varieties, three of each, John B. Moore & Son,	$15 00
Twelve distinct named varieties, William H. Spooner,	10 00
Second, John L. Gardner,	8 00
Third, Francis B. Hayes,	6 00
Six distinct named varieties, John L. Gardner,	8 00
Second, John S. Richards,	6 00
Third, John S. Richards,	4 00
Three distinct named varieties, Francis B. Hayes,	4 00
Second, John S. Richards,	3 00
Third, John L. Gardner,	2 00
MOSS ROSES. — Six named varieties, three clusters of each, William H. Spooner,	4 00
Second, John B. Moore & Son,	3 00
Three named varieties, three clusters of each, John B. Moore & Son,	3 00
Second, William H. Spooner,	2 00
General Display, of one hundred bottles of Hardy Roses, John B. Moore & Son,	8 00
Second, Norton Brothers,	7 00
Third, John S. Richards,	6 00
Fourth, Francis B. Hayes,	5 00
Fifth, William H. Spooner,	4 00
STOVE AND GREENHOUSE FLOWERING PLANTS, no Orchid admissible. — Six named varieties, in bloom, H. H. Hunnewell,	8 00
Second, John L. Gardner,	6 00
SPECIMEN PLANT, in bloom, other than Orchid, regard being had to new or rare varieties, John L. Gardner, *Erica Bothwelliana*,	4 00
Second, H. H. Hunnewell, *Rhynchospermum jasminioides*,	2 00
SPECIMEN FOLIAGE PLANT. — For the best, named, H. H. Hunnewell, *Bertolonia Van Houttei*,	4 00
ORCHIDS. — Three named varieties, in bloom, F. L. Ames,	6 00
Second, E. W. Gilmore,	4 00
Single plant, named, David Allan, *Cattleya Mossiæ*,	3 00
Second, F. L. Ames, *Cypripedium Stonei*,	2 00
HERBACEOUS PÆONIES. — Ten named varieties, Francis B. Hayes,	3 00
Second, C. M. Hovey,	2 00
SWEET WILLIAMS. — Thirty trusses, not less than six distinct varieties, E. Sheppard,	3 00
Second, C. M. Hovey,	2 00
Third, J. W. Manning,	1 00
VASE OF FLOWERS. — Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill,	4 00
Second, James O'Brien,	3 00
Third, Miss S. W. Story,	2 00
HERBACEOUS PLANTS. — J. W. Manning,	2 00
Second, Miss S. W. Story,	1 00

Gratuities: —

John S. Richards, Collection of Roses,	$3 00
Benjamin G. Smith, " " "	3 00
John B. Moore & Son, " " "	3 00
William H. Spooner, " " "	3 00
Norton Brothers, " " "	3 00
Mrs. E. M. Gill, " " "	3 00
Francis B. Hayes, " " "	3 00
Warren Heustis, " " "	2 00
John B. Moore & Son, " " "	2 00
John S. Richards, " " "	1 00
David Allan, gardener to R. M. Pratt, Orchids,	10 00
F. L. Ames, "	10 00
" " Cut Flowers,	3 00
H. H. Hunnewell, Orchids,	15 00
John L. Gardner, "	5 00
F. Becker, Palms,	15 00
W. C. Strong, Evergreens,	10 00
Edward W. Breed, Collection of Pinks,	2 00
W. C. Strong, Collection of Maple foliage,	2 00
Francis B. Hayes, Kalmia, etc.,	2 00
" " " Clematis,	1 00
C. O. Saunders, "	1 00
John C. Hovey, Richardson's Seedling Pæonies, etc.,	1 00
Joseph Tailby, Pinks,	1 00
L. H. Farlow, Gloxinias,	1 00
John L. Gardner, Canterbury Bells, etc.,	1 00
C. M. Hovey, Lilies,	1 00
Benjamin G. Smith, Delphiniums,	1 00
Mrs. A. D. Wood, Stand of Flowers,	2 00
E. Sheppard, Collection of Flowers,	3 00
Mrs. E. M. Gill, Greenhouse Flowers,	1 00
" " " " Cut Flowers,	1 00
E. H. Hitchings, Kalmia, etc.,	2 00

JUNE 28.

Gratuity: —

Miss S. W. Story, Cut Flowers,	1 00

JULY 5.

HYBRID PERPETUAL ROSES. — Twenty-four blooms, of twenty-four distinct named varieties, in vases, John B. Moore & Son,	4 00
Second, William H. Spooner,	3 00
DELPHINIUMS. — Six named varieties, Henry P. Walcott,	3 00
Second, Benjamin G. Smith,	2 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill,	4 00
Second, W. K. Wood,	3 00

HERBACEOUS PLANTS. — J. W. Manning, ... $2 00
Second, Miss S. W. Story, ... 1 00

Gratuities : —

William H. Spooner, Hybrid Perpetual Roses, ... 2 00
" " " Moss Roses, ... 1 00
John B. Moore & Son, Hybrid Perpetual Roses, ... 1 00
B. G. Smith, Delphiniums, ... 2 00
" " " Lilies and Single Dahlias, ... 1 00
C. M. Hovey, Rhododendrons, ... 2 00
E. Sheppard, Sweet Williams, ... 1 00
" " Drummond Phlox, ... 1 00
Francis Parkman, *Iris Kæmpferi*, ... 2 00
Miss S. W. Story, Display, ... 1 00
Mrs. P. D. Richards, Native Flowers, ... 2 00
E. H. Hitchings, " " 2 00

JULY 12.

JAPAN IRIS.—(Varieties of *Iris Kæmpferi*), Display, Francis Parkman, ... 3 00
Second, John L. Gardner, ... 2 00
VASE OF FLOWERS.—Best arranged, in one of the Society's glass vases, Mrs. E. M. Gill, ... 3 00
Second, Mrs. A. D. Wood, ... 2 00
HERBACEOUS PLANTS.—J. W. Manning, ... 2 00
Second, Miss S. W. Story, ... 1 00

Gratuities : —

Mrs. E. M. Gill, Gloxinias and Hollyhocks, ... 1 00
Robert T. Jackson, Lilies and Herbaceous Plants, ... 1 00
Miss E. M. Harris, Lilies, ... 1 00
" " " Hollyhocks, ... 1 00
E. Sheppard, " 1 00
Mrs. E. S. Joyce, " 1 00
" " " " Display of Flowers, ... 1 00
John L. Gardner, Ericas, ... 5 00
C. M. Hovey, Orchids, ... 3 00
David Allan, " 3 00
Miss S. W. Story, Display, ... 1 00

JULY 19.

HOLLYHOCKS. — Twelve blooms, of twelve distinct colors, Edwin Fewkes, ... 4 00
Second, Miss E. M. Harris, ... 3 00
Six blooms, of six distinct colors, John S. Richards, ... 2 00
Second, Mrs. E. M. Gill, ... 1 00
Three blooms, of three distinct colors, Mrs. A. D. Wood, . . 1 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, ... 4 00
Second, W. K. Wood, ... 3 00

HERBACEOUS PLANTS. — J. W. Manning, ... $2 00
Second, Miss S. W. Story, ... 1 00

Gratuities: —

Charles F. Curtis, Hollyhocks, ... $1 00
Mrs. E. S. Joyce, " 1 00
Miss E. M. Harris, " 3 00
Edwin Sheppard, " 2 00
Mrs. E. M. Gill, Lilies and Hollyhocks, ... 2 00
Mrs. E. S. Joyce, Display, ... 2 00
Miss S. W. Story, " 2 00
E. H. Hitchings, Native Flowers, ... 2 00
Mrs. P. D. Richards, " 2 00
R. B. Cummings, Bouquet of Native Flowers, ... 1 00

JULY 26.

PELARGONIUMS. — Six double and six single varieties, named, one truss of each, Edwin Sheppard, ... 2 00
PERENNIAL PHLOXES. — Six named varieties, Edwin Sheppard, . 3 00
Second, J. W. Manning, ... 2 00
VERBENAS. — Thirty bottles, one truss in each, Edwin Sheppard, . 3 00
Second, C. M. Hovey, ... 2 00
Third, Mrs. E. M. Gill, ... 1 00
SWEET PEAS. — Display, filling twenty-five bottles, Mrs. A. D. Wood, ... 3 00
Third prize to Benjamin G. Smith, ... 1 00
HERBACEOUS PLANTS. — J. W. Manning, ... 2 00
Second, Miss S. W. Story, ... 1 00

Gratuities: —

E. Sheppard, Hollyhocks, Pelargoniums, and Fuchsias, . . . 2 00
Mrs. E. M. Gill, Pelargoniums, ... 1 00
Joseph H. Woodford, Sweet Peas, ... 1 00
Miss Davis, Sweet Peas, ... 1 00
John C. Hovey, *Convolvulus leptophyllus*, from New Mexico, . . 1 00
Joseph Tailby, *Brassia verrucosa*, ... 2 00
Charles F. Curtis, Dark Hollyhocks, ... 1 00
Edwin Fewkes, Dahlias, ... 1 00
Mrs. Margaret Parker, *Limnocharis Humboldtii* and *Nelumbium speciosum*, ... 1 00
Miss S. W. Story, Display, ... 2 00
Mrs. E. S. Joyce, Display of Flowers, ... 1 00
Mrs. E. M. Gill, Collection of Flowers, ... 1 00
Mrs. A. D. Wood, Vase of Flowers, ... 2 00
Mrs. P. D. Richards, Native Flowers, ... 3 00

AUGUST 2.

STOCKS. — Six varieties, one cut plant of each, Edwin Sheppard, . 2 00
BALSAMS. — Twelve spikes, not less than eight varieties, the second prize to John Parker, ... 1 00

CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, ... $4 00
Second, W. K. Wood, ... 3 00
NATIVE FERNS. — Best display, Mrs. A. J. Dolbear, . . . 3 00
Second, Mrs. P. D. Richards, ... 2 00
HERBACEOUS PLANTS. — J. W. Manning, ... 2 00
Second, Miss S. W. Story, ... 1 00

Gratuities: —

Edwin Fewkes, Dahlias, ... 2 00
John Parker, " 1 00
W. H. Spooner, Salet Moss Roses, ... 2 00
Miss S. W. Story, Cut Flowers, ... 2 00
E. Sheppard, " " 2 00
E. H. Hitchings, Native Flowers, ... 2 00

AUGUST 9.

PERENNIAL PHLOXES. — Ten distinct named varieties, one spike of each, E. Sheppard, ... 3 00
PETUNIAS. — Collection, filling thirty bottles, one spray in each, John Parker, ... 3 00
Second, Mrs. E. M. Gill, ... 2 00
Third, " " 1 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, ... 4 00
Second, C. M. Hovey, ... 3 00
Third, W. K. Wood, ... 2 00
NATIVE FLOWERS. — Collection, Mrs. P. D. Richards, . . . 3 00
HERBACEOUS PLANTS. — J. W. Manning, ... 2 00
Second, Miss S. W. Story, ... 1 00

Gratuities: —

E. Sheppard, Phloxes and Delphiniums, ... 2 00
W. H. Spooner, Salet Moss Roses, ... 2 00
John B. Moore & Son, Hybrid Perpetual Roses, ... 2 00
B. G. Smith, Single Dahlias, ... 1 00
John Parker, Dahlias, ... 1 00
C. M. Hovey, Seedling Lilies, ... 2 00
Miss S. W. Story, Display of Flowers, ... 2 00
Edwin Fewkes, " " " 2 00
W. H. Badlam, *Sabbatia chloroides*, ... 1 00
R. B. Cummings, Native Flowers, ... 1 00

AUGUST 16.

GLADIOLI. — Twenty named varieties, in spikes, William T. Merrifield, ... 8 00
Second, Mrs. T. L. Nelson, ... 6 00
Ten named varieties, in spikes, F. Bacheller, ... 4 00
Second, Mrs. T. L. Nelson, ... 3 00
Six named varieties, in spikes, F. Bacheller, ... 3 00

Display of named and unnamed varieties, filling one hundred bottles, James Cartwright,	$6 00
PHLOX DRUMMONDI. — Fifty bottles, not less than six varieties, Mrs. T. L. Nelson,	2 00
Second, C. M. Hovey,	1 00
HERBACEOUS PLANTS. — J. W. Manning,	2 00
Second, Miss S. W. Story,	1 00

Gratuities: —

George S. Tuttle, Pompon Dahlias,	1 00
John Parker, Dahlias,	1 00
Mrs. Mary Starkes Whiton, Dahlias,	1 00
Macey Randall, Dahlias,	2 00
John B. Moore & Son, Phloxes,	2 00
A. A. Hixon, Petunias and Sweet Peas,	1 00
Mrs. E. M. Gill, Display,	2 00
E. Sheppard, "	2 00
Miss S. W. Story, "	1 00
Mrs. A. D. Wood, "	1 00
Mrs. C. N. S. Horner, Natives,	2 00
R. B. Cummings, "	1 00

AUGUST 23.

ASTERS. — Truffaut's Pæony Flowered, thirty blooms, not less than ten varieties, E. Sheppard,	4 00
Second, C. M. Hovey,	3 00
Third, W. K. Wood,	2 00
Victoria Flowered, thirty blooms, not less than eight varieties, John L. Gardner,	4 00
Second, E. Sheppard,	3 00
Third, C. M. Hovey,	2 00
Pompon, thirty sprays, not less than six varieties, one spray in each bottle, C. M. Hovey,	3 00
Second, John L. Gardner,	2 00
Third, Stillman S. Hovey,	1 00
HERBACEOUS PLANTS. — J. W. Manning,	2 00
Second, Miss S. W. Story,	1 00

Gratuities: —

Franklin Bacheller, named, Gladioli,	2 00
James Cartwright, Seedling Gladiolus, Woebly,	5 00
J. Warren Clark, Seedling Gladioli,	1 00
George S. Tuttle, Pompon Dahlias,	1 00
John Parker, Dahlias,	1 00
Edwin Fewkes, Dahlias and Cannas, named,	2 00
W. K. Wood, Display of Flowers,	2 00
D. Zirngiebel, Aster, Boston Market,	1 00
Mrs. E. S. Joyce, Display of Flowers,	1 00

Miss S. W. Story, Display of Flowers, ... $1 00
Mrs. E. M. Gill, " " " 1 00
Mrs. P. D. Richards, Natives, ... 1 00
R. B. Cummings, " 1 00

AUGUST 30.

LILIUM LANCIFOLIUM. — Twelve spikes, A. McLaren, . . . 3 00
Second, Miss S. W. Story, ... 2 00
TROPÆOLUMS. — Display, filling twenty-five bottles, A. A. Hixon, . 3 00
Second, Mrs. A. D. Wood, ... 2 00
Third, Mrs. E. M. Gill, ... 1 00
MARIGOLDS. — Twenty bottles, three flowers in each, A. A. Hixon, . 3 00
Second, Mrs. E. M. Gill, ... 2 00
Third, James O'Brien, ... 1 00
SINGLE DAHLIAS. — Twenty-four bottles, one spray in each, E. Sheppard, ... 3 00
Second, Mrs. E. M. Gill, ... 2 00
Third, S. S. Hovey, ... 1 00
HERBACEOUS PLANTS. — Anthony McLaren, ... 2 00
Second, Miss S. W. Story, ... 1 00

Gratuities : —

B. G. Smith, Seedling Single Dahlias and *Lilium lancifolium*, . 2 00
D. Zirngiebel, Scabiosa and New Golden Marigold, ... 1 00
F. Bacheller, Gladioli, ... 1 00
James Cartwright, Gladioli, ... 4 00
George S. Tuttle, Pompon Dahlias, ... 1 00
John Parker, Dahlias, ... 1 00
John L. Gardner, Asters, ... 1 00
J. H. Woodford, Calendulas, ... 1 00
Miss S. W. Story, Display, ... 2 00
Mrs. E. M. Gill, " 1 00
W. K. Wood, " 2 00
Mrs. A. J. Dolbear, Natives, ... 1 00
R. B. Cummings, " 1 00
Mrs. P. D. Richards, " 1 00

SEPTEMBER 6.

DOUBLE ZINNIAS. — Twenty-five flowers, not less than six varieties, A. A. Hixon, ... 3 00
Second, E. Sheppard, ... 2 00
Third, Anthony McLaren, ... 1 00
DIANTHUS, Annual and Biennial varieties. — Collection, filling fifty bottles, single trusses, L. W. Goodell, ... 3 00
Second, E. Sheppard, ... 2 00
Third, A. A. Hixon, ... 1 00
CUT FLOWERS. — Display, filling one hundred bottles, Mrs. E. M. Gill, ... 4 00
Second, W. K. Wood, ... 3 00
Third, C. M. Hovey, ... 2 00

HERBACEOUS PLANTS. — Anthony McLaren, ... $2 00
Second, Miss S. W. Story, ... 1 00

Gratuities: —

E. Sheppard, Dahlias and Dianthus, ... 1 00
L. W. Goodell, Petunias and Dianthus, ... 3 00
James Cartwright, Gladioli, ... 3 00
B. G. Smith, Single Dahlias and Lilies, ... 2 00
C. M. Hovey, New Cannas, ... 1 00
A. A. Hixon, Scabiosas and Verbenas, ... 1 00
Miss S. W. Story, Display, ... 2 00
Mrs. E. S. Joyce, " 2 00
Green Brothers, " 1 00
R. B. Cummings, Natives, ... 2 00
Mrs. A. J. Dolbear, " 2 00
Mrs. P. D. Richards, " 2 00

SEPTEMBER 18.

Gratuity: —

N. S. Simpkins, Water Lilies, ... 2 00

ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

Hunnewell Premiums.

EVERGREEN TREES AND SHRUBS. — Display, in pots, of other than Native Evergreens of New England, named, W. C. Strong, . $8 00
Second, W. C. Strong, ... 6 00

Society's Prizes.

GREENHOUSE PLANTS. — Twelve Greenhouse and Stove Plants, of different varieties, one Dracæna and one Croton admissible, F. L. Ames, ... 30 00
Second, H. H. Hunnewell, ... 25 00
Third, C. M. Hovey, ... 20 00

SPECIMEN FLOWERING PLANTS. — Six named varieties in bloom, David Allan, ... 10 00
Single named specimen, David Allan, *Anthurium Andreanum*, 5 00
Second, David Allan, *Ixora Colei*, ... 4 00

VARIEGATED LEAVED PLANTS. — Six named varieties, not offered in the collection of Greenhouse Plants, Crotons and Dracænas not admissible, H. H. Hunnewell, ... 12 00
Second, C. M. Hovey, ... 10 00
Single specimen, named, not offered in any collection, David Allan, Croton Queen Victoria, ... 5 00
Second, H. H. Hunnewell, *Croton nobilis*, ... 4 00

CALADIUMS. — Six named varieties, David Allan, ... $5 00
Second, David Allan, ... 4 00
FERNS. — Six named varieties, no Adiantums admissible, F. L. Ames, 6 00
Second, David Allan, ... 4 00
ADIANTUMS. — Six named varieties, David Allan, ... 5 00
TREE FERN. — Single specimen, named, David Allan, *Alsophila capensis*, ... 6 00
Second, C. M. Hovey, *Dicksonia antarctica*, ... 4 00
LYCOPODS. — Four named varieties, David Allan, ... 3 00
DRACÆNAS. — Six named varieties, H. H. Hunnewell, . . . 6 00
Second, David Allan, ... 5 00
CROTONS. — Six named varieties, in not exceeding six-inch pots, David Allan, ... 4 00
Second, H. H. Hunnewell, ... 3 00
PALM. — Single specimen, named, David Allan, *Areca lutescens*, . 5 00
Second, C. M. Hovey, *Phœnix reclinata*, ... 4 00
NEPENTHES. — Three plants, named, F. L. Ames, ... 5 00
AGAVES. — Six distinct named varieties, C. M. Hovey, . . . 5 00
SUCCULENTS. — Collection (other than Agaves and Yuccas), of twelve named species and varieties, C. M. Hovey, . . . 5 00
BEGONIAS. — Tuberous rooted, six seedling varieties, E. Sheppard, 4 00
ORCHIDS. — Three varieties, in bloom, F. L. Ames, . . . 6 00
Second, F. L. Ames, ... 4 00
Single plant in bloom, H. H. Hunnewell, *Cattleya Dowiana aurea*, ... 3 00
Second, David Allan, *Cypripedium Sedeni*, ... 2 00
GLADIOLI. — Best display and best kept, of named or unnamed varieties, filling one hundred bottles, the second prize to H. B. Watts, ... 6 00
Third, E. Sheppard, ... 4 00
DAHLIAS. — Twelve named varieties, J. L. Willey, ... 5 00
Second, E. Sheppard, ... 4 00
Six named varieties, John Parker, ... 3 00
Second, E. Sheppard, ... 2 00
Single named flower, fancy or self, E. Sheppard, ... 2 00
LILIPUTIAN DAHLIAS. — General display, filling twenty-five bottles, J. L. Willey, ... 3 00
Second, George S. Tuttle, ... 2 00
CUT FLOWERS. — Best display and best kept during the exhibition, filling one hundred and fifty bottles, Mrs. E. M. Gill, . . 16 00
Second, C. M. Hovey, ... 14 00
Third, W. K. Wood, ... 12 00
BASKET OF FLOWERS. — Best arranged and best kept through the exhibition, the second prize to Miss S. W. Story, . . . 4 00

Gratuities: —

W. C. Strong, Evergreens, ... 15 00
E. D. Sturtevant, Nymphæas and Nelumbiums, ... 50 00

F. L. Ames, Plants and Flowers,	$5 00
John L. Gardner, Plants,	5 00
Robert T. Jackson, Marigolds,	3 00
John Mitchell, Lilies and Zinnias,	1 00
B. G. Smith, Marigolds and Zinnias,	1 00
E. Sheppard, Single Dahlias, Clematis, and Delphiniums,	2 00
B. G. Smith, " "	1 00
Macey Randall, Dahlias (Dwarfs and Liliputians),	3 00
John Parker, Dahlias,	1 00
E. Sheppard, "	1 00
John B. Moore & Son, *Anemone Japonica alba*,	1 00
B. G. Smith, Eulalias, Lilies, and Pinks,	2 00
Robert T. Jackson, Colchicums,	1 00
W. C. Strong, Fifty varieties of Deciduous Foliage, of recent introduction,	3 00
Henry Ross, Cactus,	2 00
Francis B. Hayes, Display,	2 00
Mrs. Stillman S. Hovey, Basket of Dried Flowers,	2 00
R. B. Cummings, Natives,	3 00
Mrs. C. N. S. Horner, "	3 00
Mrs. P. D. Richards, "	3 00

CHRYSANTHEMUM SHOW.

November 13 and 14.

Chrysanthemums. — Six Large Flowered, or Chinese, distinct named varieties, one in each pot, John L. Gardner,	$8 00
Second, H. P. Walcott,	6 00
Third, E. W. Wood,	4 00
Six Japanese, distinct named varieties, John L. Gardner,	8 00
Second, H. P. Walcott,	6 00
Third, E. W. Wood,	4 00
Four Pompons, distinct named varieties, E. W. Wood,	5 00
Second, H. P. Walcott,	4 00
Specimen Plant, Large Flowered, or Chinese, named, H. P. Walcott, Crimson King,	4 00
Second, H. P. Walcott, Golden Queen of England,	3 00
Third, E. W. Wood, John Salter,	2 00
Specimen Plant, Japanese, named, John L. Gardner, La Charmeuse,	4 00
Second, H. P. Walcott, President Parkman,	3 00
Third, H. P. Walcott, Cossack,	2 00
Specimen Plant, Pompon, named, John L. Gardner, Amphilla,	4 00
Second, E. W. Wood, Golden Circle,	3 00
Third, H. P. Walcott, Golden Circle,	2 00
Best display of named plants, in pots, all classes, not less than ten varieties, H. P. Walcott,	20 00

Second, E. W. Wood,	$16 00
Third, Marshall P. Wilder,	12 00
Fourth, James O'Brien,	10 00
Fifth, C. M. Hovey,	8 00
Twelve cut blooms, Large Flowered, or Chinese, named, H. P. Walcott,	4 00
Second, Edwin Fewkes,	3 00
Six cut blooms, Large Flowered, or Chinese, named, E. W. Wood,	3 00
Display of twenty-four sprays, not less than twelve varieties, Large Flowered, or Chinese, in vases, Edwin Fewkes,	4 00
Second, E. W. Wood,	3 00
Display of twenty-four sprays, not less than twelve varieties, Japanese, in vases, Edwin Fewkes,	4 00
Second, E. W. Wood,	3 00
Third, E. Sheppard,	2 00
Display of twenty-four sprays, not less than twelve varieties, Pompons, in vases, Edwin Fewkes,	3 00
Second, E. W. Wood,	2 00
Orchids. — Three varieties in bloom, E. W. Gilmore,	8 00
Second, H. H. Hunnewell,	6 00
Third, E. W. Gilmore,	4 00
Single plant in bloom, E. W. Gilmore, *Dendrobium formosum giganteum*,	4 00
Second, H. H. Hunnewell, *Cattleya Oxoniensis*,	3 00

Gratuities: —

Norton Brothers, Collection of Chrysanthemums,	8 00
Delay & Meade, " "	8 00
E. W. Wood, Chrysanthemum plants,	2 00
Delay & Meade, Cut Flowers of Chrysanthemums,	2 00
P. Malley, " " "	2 00
E. Sheppard, " " "	2 00
Edwin Fewkes, " " "	2 00
John Thorpe, " " "	3 00
W. S. Ward, " " "	1 00
Mrs. E. M. Gill, " " "	3 00
Edwin Fewkes, Cut Flowers of New Japanese Chrysanthemums,	3 00
Mrs. A. D. Wood, Basket of Chrysanthemums,	2 00
E Sheppard, named Pelargoniums,	2 00
W. A. Bock, Pansies,	1 00
W. A. Manda, Bouquet of Grass,	2 00
David Allan, Cut Flowers,	3 00
Mrs. Francis B. Hayes, Cut Flowers,	3 00
Miss S. W. Story, Basket of Flowers,	2 00
Mrs. P. D. Richards, Natives,	2 00

December 6.

Gratuities: —

Mrs. Francis B. Hayes, Cut Flowers,	2 00
Mrs. A. D. Wood, " "	1 00

DECEMBER 18.

Gratuities : —

David Allan, gardener to R. M. Pratt, *Cattleya labiata Percivaliana*, ... $3 00
Mrs. A. D. Wood, Basket of Chrysanthemums, ... 1 00

BRONZE MEDALS.

Spring Exhibition, May 10. David Allan, gardener to R. M. Pratt, *Odontoglossum Edwardsii.*
Chrysanthemum Show, November 6 and 7. W. A. Manda, gardener of Cambridge Botanic Garden, Plants.

SILVER MEDALS.

February 9. F. L. Ames, *Dendrobium Ainsworthii.*
Azalea and Rose Show, March 20 and 21. Woolson & Co., Narcissus.
" " " " " F. L. Ames, *Phalænopsis Stuartiana.*
" " " " " H. H. Hunnewell, *Cypripedium Dayanum.*
" " " " " David Allan, Orchid Flowers.
" " " " " E. W. Gilmore, *Phaius tuberculosus.*
" " " " " Hovey & Co., *Dracæna Lindeni.*
April 19. N. S. Simpkins, twelve blooms Cornelia Cook Rose.
" F. L. Ames, *Cypripedium ciliare.*
May 3. David Allan, Seedling Auriculas.
June 7. John L. Gardner, *Azalea decora.*
Rose and Strawberry Show, June 24 and 25. John S. Richards, Climbing Rose, Boston Belle.
" " " " " David Allan, New Japan Ferns.
" " " " " H. H. Hunnewell, *Cattleya Mossiæ.*
" " " " " " " Pelargoniums.
July 12. David Allan, *Dendrobium Dearei.*
August 2. Robert T. Jackson, Collection of Ferns.
" 30. Daniel Duffley, *Amaryllis Belladonna.*
Annual Exhibition, September 16–19. H. H. Hunnewell, *Licuala grandis.*
" " " " S. R. Payson, Collection of Plants.
" " " " " " *Alocasia Thibautiana.*
" " " " F. L. Ames, *Nepenthes Amesiana.*
" " " " " " *Pritchardia grandis.*
Chrysanthemum Show, November 6 and 7. H. P. Walcott, Seedling Chrysanthemums.
" " " " E. W. Gilmore, Display of Orchids.
December 6. Jacob W. Manning, Exhibits of Herbaceous Plants.

FIRST CLASS CERTIFICATES OF MERIT.

April 26. David Allan, *Bomarea conferta.*
" " " " *Bomarea frondea.*
July 12. C. M. Hovey, *Statice Suworrowi.*
" 26. John C. Hovey, *Amaryllis coccinea flore-pleno.*
" 26. Marshall P. Wilder, New Rose, Marshall P. Wilder.
August 2. Robert T. Jackson, *Campanula cæspitosa.*
" 2. Edwin Fewkes, *Tigridia pavonia alba.*
" 9. Denys Zirngiebel, Improved White Seedling Aster.
" 16. William E. Endicott, Seedling Gladioli.
Annual Exhibition, September 16–19. Robert T. Jackson, Seedling Dahlias.
" " " " F. L. Ames, *Platycerium Hilli.*
" " " " David Allan, *Gleichenia dicarpa longipinnata.*
Chrysanthemum Show, November 6 and 7. Henry P. Walcott, Seedling Chrysanthemums.
" " " " John Thorpe, Seedling Chrysanthemums.
" " " " Arthur H. Fewkes, Seedling Chrysanthemums.
" " " " David Allan, *Cypripedium Fairieanum.*
" " " " J. M. Ward, Seedling Bouvardias.

REPORT

OF THE

COMMITTEE ON FRUITS,

FOR THE YEAR 1884.

By E. W. WOOD, Chairman.

The past season has been more than usually favorable for the various fruits grown in this vicinity. In the early spring every variety of fruit gave promise of an abundant crop, with the exception of peaches, the fruit buds of which were killed during the winter, except in certain locations protected from the west winds, indicating that the cold winds rather than extremely low temperature caused the injury.

The strawberries were injured to a limited extent in some parts of the State by late frosts, but the favorable weather during the season of growth and ripening more than offset any previous unfavorable conditions, and the crop was above the average. The frequent rains until the ripening of the small fruits were favorable to all except the cherry, which, in many places, owing to wet weather, proved almost an entire failure.

Strawberries. — At the special exhibition of this fruit, June 24 and 25, we had a good representation of the different varieties. The first prize for any variety was again awarded to the Sharpless, and the second prize to the seedling Belmont, grown and exhibited by Warren Heustis, which seems to be a new variety, of more than ordinary merit. The Committee visited Mr. Heustis's grounds June 21, and saw the fruit upon the vines. The plants were of unusually strong growth and were bearing an exceedingly heavy crop of fruit.

The berries are of large size, good form and color, quality very much like the Sharpless; and its firm flesh and exceptionally good keeping qualities must make it desirable as a market variety, while its attractive appearance and quality will insure it a place in the private garden. Of the other varieties of recent introduction the Mount Vernon and Warren seem the most deserving of notice. The former was shown in a collection from Providence, R.I., and was of large size, regular in form, dark color, good quality, and it was said by the exhibitor to be productive. The Warren is a handsome fruit, above medium in size, and of superior quality.

The plan of showing twenty-four and forty-eight berries instead of two and four quarts seemed to prove satisfactory, and the change is especially desirable if the exhibitions are to be continued two days instead of one as formerly, as it seems an unnecessary waste of fruit to show in larger quantity than is requisite for accurate judgment, for the fruit is of little worth at the close of a two days' exhibition.

Currants were shown in more than the usual quantity. For the first time Fay's Prolific was shown in competition with the other red varieties; in size it is inferior to the Versaillaise. The Transparent, a French variety, took the prize over Dana's Transparent as a white currant.

Cherries were shown in less quantity than for several years, owing to wet weather at the time of ripening. The frequent loss from this cause of some of the best varieties of the cherry renders them less reliable than most of the small fruits.

Raspberries were shown in larger quantity than the average. The Franconia and Cuthbert were the leading varieties, and the prizes were divided about equally between them.

Blackberries. — There was very little competition with this fruit, though one exhibitor showed fine specimens of the Dorchester at seven successive Saturday exhibitions.

Gooseberries were shown in about the usual quantity. The prizes for natives were taken by the Downing, and for foreign varieties, the first prize was awarded to Bang-Up, and the second to Whitesmith.

Plums. — The display of this fruit has steadily increased for several years, and has become an interesting feature of our exhibitions, and there have been added several new and desirable varieties. While perhaps none excel the old and well-known Green Gage in quality, most of them are larger and finer in appearance.

PEACHES. — Between that fatal disease, the yellows, and the killing of the fruit buds in winter, the peach has become very unreliable in this vicinity; but the trees are so quickly and easily grown, and the fruit is so desirable when we can pick it in eating condition from the tree, that an occasional crop pays for the trouble and expense, and the demand for nursery trees has been increasing for several years.

GRAPES. — The early part of the season was unfavorable for this fruit, being too cold and wet, causing mildew very generally; but the late season was clear and dry, and the more hardy varieties ripened fairly well. The fruit shown was hardly a fair average with previous years.

Of FOREIGN GRAPES the show was the best for several years. The Special Prize offered for the last six years "for the heaviest and best-ripened bunch of any Foreign Black Grape not less than five pounds" was awarded this year, for the first time, to David Allan for a bunch of Black Hamburg, well colored, and weighing five and one-fourth pounds.

PEARS have been shown filling the list at every exhibition when prizes have been offered. At the Annual Exhibition sixty-four prizes were offered, every one of which was awarded, and among the leading varieties the competition was strong and close. There have been no new varieties shown the past season, the effort of growers appearing to be directed mainly to the best of the well-known kinds. Prizes have been offered at every exhibition, in addition to those for special varieties, for "any other variety," and frequently the Committee have felt obliged to award the prizes to those kinds for which special prizes were offered on other Saturdays, they being so decidedly superior to those shown outside the list.

APPLES have been abundant and of superior quality. The insect pests have not been as numerous as in past years, and the fruit has been unusually smooth and fair. The large exhibits of the Gravenstein and Baldwin would indicate that growers find them the most profitable varieties for market.

The Missouri State Horticultural Society forwarded to ex-President Wilder a collection of between thirty and forty varieties of apples, which he placed upon our tables. The collection was very interesting as affording an opportunity to see the popular apples of the South and West, which are seldom shown here, and the Society is much indebted to Mr. Wilder therefor. Among the handsomest specimens were the Rome Beauty, Gano, Winter Sweet Paradise,

Ben Davis, White Winter Pearmain, Wagener, Lady's Sweet, Esopus Spitzenberg, Yellow Bellflower, Fall Wine, Gen. Lyon, Jonathan, Winesap, Monmouth Pippin, and Fameuse. Several of the varieties were cultivated by William Coxe in New Jersey, and described by him in 1818, and long since tested here, but most of them proved to be adapted only to a more southern climate. The collection was placed on our tables January 31, having been shown at Kansas City from the 22d to the 26th of the same month. The specimens were undoubtedly, when first exhibited, very fine, but had necessarily lost their freshness and consequently their beauty, and still more their flavor, when brought to the notice of the Committee.

Of the fruits previously entered for the Prospective Prizes, the Hayes grape was the only one to which the attention of the Committee was called during the year. Mr. Heustis has entered his seedling strawberry, the Belmont, for the Prospective Prize.

Of the $1,000 placed at the disposal of the Committee for prizes and gratuities, they have awarded $942, leaving a balance of $48. With the increased appropriation, which the Society has voted for next year, the Committee have increased the prizes to one-half more than they were last year, and confidently anticipate a corresponding increase in the exhibits.

Fruit growers have reason to take encouragement from the results of the year. The small fruits have sold at a fair profit. Pears of the desirable varieties have sold readily, at good prices, and the export trade in apples has relieved the market of the superabundance, and made the crop fairly remunerative, so that, beside furnishing their own families with one of the most enjoyable luxuries of the season, orchardists have contributed to the health and enjoyment of those who have favored them with their patronage.

E. W. Wood,
P. B. Hovey,
Jacob W. Manning,
Warren Fenno,
Charles F. Curtis,
Committee on Fruits.

PRIZES AND GRATUITIES AWARDED FOR FRUITS.

MARCH 20.

WINTER APPLES.— John Cummings, Baldwin,	$3 00
Second, C. W. Grant, "	2 00
WINTER PEARS. — Warren Fenno, Duchess of Bordeaux,	3 00
Second, Warren Fenno, Easter Beurre,	2 00
Gratuities: —	
Warren Fenno, Pears,	1 00
B. G. Smith, "	1 00
A. S. McIntosh, Pears and Apples,	1 00

APRIL 5.

Gratuity: —	
Benjamin P. Ware, Apples,	1 00

MAY 10.

Gratuity: —	
C. W. Grant, Baldwin Apples,	1 00

JUNE 14.

Gratuity: —	
William Doran & Son, Crescent Strawberries,	1 00

JUNE 21.

Gratuity: —	
Aaron D. Capen, Strawberries,	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 24 AND 25.

Special Prizes.

STRAWBERRIES.— Four quarts of any variety, George Hill, Sharpless, Silver Cup, value,	$20 00
Second, Warren Heustis, Belmont,	15 00
Third, John L. Gardner, Sharpless,	10 00

Regular Prizes.

STRAWBERRIES. — Forty-eight berries of Bidwell, Francis B. Hayes,	3 00
Second, L. W. Weston,	2 00
Third, Marshall P. Wilder,	1 00
Cumberland, William H. Hunt,	3 00
Second, Joseph D. Fitts,	2 00
Third, Benjamin G. Smith,	1 00

Charles Downing, E. W. Wood,	$3 00
Second, John L. Gardner,	2 00
Third, William Doran & Son,	1 00
Hervey Davis, John B. Moore & Son,	3 00
Second, Francis B. Hayes,	2 00
Third, Joseph D. Fitts,	1 00
Jucunda, John L. Gardner,	3 00
Miner's Great Prolific, Joseph D. Fitts,	3 00
Second, Benjamin G. Smith,	2 00
Seth Boyden, Marshall P. Wilder,	3 00
Sharpless, George Hill,	3 00
Second, Francis Parkman,	2 00
Third, B. Judkins,	1 00
Wilder, Horace Eaton,	3 00
Second, W. C. Winter,	2 00
Twenty-four berries of Bidwell, B. G. Smith,	2 00
Second, Hovey & Co.,	1 00
Brighton, Warren Fenno,	2 00
Champion, J. D. Fitts,	2 00
Second, Marshall P. Wilder,	1 00
Crescent, L. W. Weston,	2 00
Cumberland, Marshall P. Wilder,	2 00
Second, B. G. Smith,	1 00
Charles Downing, E. W. Wood,	2 00
Second, Hovey & Co.,	1 00
Hervey Davis, Marshall P. Wilder,	2 00
Second, B. G. Smith,	1 00
Hovey, Hovey & Co.,	2 00
Jersey Queen, J. D. Fitts,	2 00
Second, James Kimball,	1 00
Jucunda, J. D. Fitts,	2 00
La Constante, John L. Gardner,	2 00
Manchester, Warren Heustis,	2 00
Second, John L. Gardner,	1 00
Miner's Great Prolific, B. G. Smith,	2 00
Seth Boyden, the second prize to J. D. Fitts,	1 00
Sharpless, George Hill,	2 00
Second, Warren Heustis,	1 00
Wilder, Horace Eaton,	2 00
Second, Marshall P. Wilder,	1 00
Wilson, Hovey & Co.,	2 00
Second, J. D. Fitts,	1 00
Any other variety, Warren Heustis, Belmont,	2 00
Second, J. D. Fitts, Mount Vernon,	1 00
Collection of six varieties, J. D. Fitts,	4 00
Second, Marshall P. Wilder,	3 00
One quart of any new variety not previously exhibited, J. D. Fitts, Old Iron Clad,	3 00
Second, J. D. Fitts, Daniel Boone,	2 00

CHERRIES. — Two quarts of any variety, Horace W. Killam, White Heart, ... $2 00
FOREIGN GRAPES. — Francis B. Hayes, Black Hamburg, . . 5 00
Second, Francis B. Hayes, Victoria Hamburg, ... 4 00

Gratuities: —

William C. Strong, Strawberries, ... 2 00
William H. Hunt, Seedling Strawberry, ... 1 00
John B. Moore & Son, Hervey Davis Strawberries, ... 1 00
E. W. Wood, Charles Downing Strawberries, ... 1 00

JUNE 28.

Gratuity: —

S. Lockwood, Jr., Cherries, ... 1 00

JULY 5.

STRAWBERRIES. — Twenty-four berries of any variety, Warren Heustis, Belmont, ... 2 00
Second, B. Judkins, Bidwell, ... 1 00
CHERRIES. — Two quarts of Black Tartarian, Horace Partridge, . 2 00
Coe's Transparent, S. Lockwood, Jr., ... 2 00
Any other variety, C. N. Brackett, Black Bigarreau, . . . 2 00
Second, M. W. Chadbourne, White Heart, ... 1 00

JULY 12.

CHERRIES. — Two quarts of any variety, Samuel Lockwood, Jr., Downer's Late, ... 2 00
Second, Warren Fenno, Norfolk, ... 1 00
RASPBERRIES. — Two quarts of any variety, William Doran & Son, Franconia, ... 2 00
Second, C. E. Grant, Herstine, ... 1 00
CURRANTS. — Forty-eight bunches of any Red variety, W. K. Wood, Versaillaise, ... 3 00
Second, William Doran & Son, Versaillaise, ... 2 00
Third, B. G. Smith, Versaillaise, ... 1 00
Any White variety, B. G. Smith, Transparent, ... 3 00
Second, B. G. Smith, Dana, ... 2 00

Gratuities: —

M. W. Chadbourne, Cherries and Currants, ... 1 00
C. N. Brackett, Seedling Cherries, ... 1 00
Horace Partridge, Cherries, ... 1 00

JULY 19.

RASPBERRIES. — Collection of not less than four varieties, William Doran & Son, ... 4 00
Two quarts of any variety, William Doran & Son, Franconia, . 2 00
Second, B. Judkins, Cuthbert, ... 1 00

Currants. — Twenty-four bunches of Dana, B. G. Smith,	$2 00
Second, Mrs. E. M. Gill,	1 00
Versaillaise, B. G. Smith,	2 00
Second, William Doran & Son,	1 00
Any other variety, R. Manning, White Gondouin,	2 00
Second, R. Manning, Red Dutch,	1 00
Gratuities: —	
B. G. Smith, Collection,	1 00
S. Lamson, Currants,	1 00
Warren Fenno, Gooseberries,	1 00

July 26.

Currants. — Twenty-four bunches of any Red variety, B. G. Smith, Versaillaise,	2 00
Second, Mrs. E. M. Gill, Red Dutch,	1 00
Any White variety, B. G. Smith, Transparent,	2 00
Second, B. G. Smith, Dana,	1 00
Blackberries. — Two quarts of any variety, A. S. McIntosh, Dorchester	2 00
Gooseberries. — Two quarts of any Native variety, Warren Fenno,	2 00
Second, M. W. Chadbourne,	1 00
Gratuities: —	
Mrs. E. M. Gill, Gooseberries,	1 00
B. Judkins, Black Cap Raspberries,	1 00
R. Manning, Pears and Currants,	1 00

August 2.

Blackberries. — Two quarts of any variety, A. S. McIntosh,	2 00
Second, C. E. Grant,	1 00
Gooseberries. — Two quarts of Foreign, B. G. Smith, Bang-Up,	2 00
Second, B. G. Smith, Whitesmith,	1 00
Pears. — Summer Doyenne, Horace Eaton,	2 00
Second, B. G. Smith,	1 00
Any other variety, C. Terry, Madeleine,	2 00
Second, Warren Fenno, Madeleine,	1 00
Gratuity: —	
Warren Fenno, Gooseberries,	1 00

August 9.

Apples. — Early Harvest, Horace Eaton,	2 00
Sweet Bough, Warren Heustis,	2 00
Second, Joseph G. Coolidge,	1 00
Any other variety, C. N. Brackett, Early Margaret,	2 00
Second, C. F. Curtis, Red Astrachan,	1 00

PEARS. — Giffard, John Fillebrown,	$2 00
Second, Mrs. Mary Langmaid,	1 00
Any other variety, George Frost, Quimper,	2 00
Second, Horace Eaton, Desportes,	1 00
Gratuities: —	
B. G. Smith, Apples,	1 00
Warren Heustis, Apples and Pears,	1 00
A. S. McIntosh, Blackberries,	1 00

AUGUST 16.

APPLES. — Red Astrachan, S. H. Record,	2 00
Second, Horace Eaton,	1 00
Williams, Charles F. Curtis,	2 00
Second, C. W. Grant,	1 00
PEARS. — Clapp's Favorite, C. S. Hosmer,	2 00
Second, John S. Bird,	1 00
Elizabeth, Mary Langmaid,	2 00
Second, Alexander Dickinson,	1 00
Any other variety, John Fillebrown, Giffard,	2 00
Second, C. N. Brackett, Brandywine,	1 00
FOREIGN GRAPES. — Two bunches of any variety, David Allan, Black Hamburg,	5 00
Second, Winter Brothers, Muscat of Alexandria,	4 00
Gratuities: —	
John B. Moore & Son, Blackberries,	1 00
A. S. McIntosh, "	1 00
Warren Heustis, Apples and Pears,	1 00
Warren Fenno, " "	1 00
B. G. Smith, " "	1 00
M. W. Chadbourne, " "	1 00
S. Hartwell, Peaches,	2 00

AUGUST 23.

PEARS. — Bartlett, W. S. Janvrin,	2 00
Second, Warren Fenno,	1 00
Rostiezer, C. N. Brackett,	2 00
Second, George Frost,	1 00
Tyson, Warren Fenno,	2 00
Second, B. G. Smith,	1 00
Any other variety, B. C. Vose, Clapp's Favorite,	2 00
Second, George Frost, Quimper,	1 00
PEACHES. — Any variety, George V. Fletcher, Hale's Early,	2 00
Second, Joseph G. Coolidge, Early Canada,	1 00
Gratuities: —	
C. W. Grant, Apples,	1 00
B. G. Smith, Apples, Pears, and Grapes,	2 00

R. Manning, Dearborn's Seedling Pears,	$1 00
John L. Bird, Pears,	1 00
M. W. Chadbourne, Pears and Apples,	1 00
A. S. McIntosh, Pears and Blackberries,	1 00
F. J. Dutcher, Plums,	1 00
Horace Partridge, Grapes and Plums,	1 00
Samuel Hartwell, Collection,	2 00

AUGUST 30.

APPLES. — Any variety, A. A. Hixon, Somerset,	2 00
Second, B. G. Smith, Garden Royal,	1 00
PEARS. — Bartlett, George S. Harwood,	2 00
Second, W. S. Janvrin,	1 00
Any other variety, Warren Fenno, Muskingum,	2 00
Second, Warren Fenno, Tyson,	1 00
PEACHES. — Any variety, George V. Fletcher, Hale's Early,	3 00
PLUMS. — Any variety, John B. Moore & Son, Washington,	2 00
Second, Horace Eaton, Bradshaw,	1 00
NATIVE GRAPES. — Six bunches of any variety, the Second Prize to B. G. Smith, Champion,	1 00
Gratuities —	
William Richardson, Apples,	1 00
S. Hartwell, "	1 00
Warren Fenno, Apples and Pears,	1 00
C. N. Brackett, " "	1 00
A. S. McIntosh, Pears and Blackberries,	1 00
William McKee, Grapes,	1 00
Horace Partridge, Grapes and Plums,	1 00

SEPTEMBER 6.

APPLES. — Foundling, B. G. Smith,	2 00
Gravenstein, John B. Moore & Son,	2 00
Second, Samuel Hartwell,	1 00
Porter, C. N. Brackett,	2 00
Second, L. W. Weston,	1 00
Any other variety, John C. Park, Alexander,	2 00
Second, S. Hartwell, Pumpkin Sweet,	1 00
PEARS, — Andrews, B. G. Smith,	2 00
Second, Warren Fenno,	1 00
Boussock, C. N. Brackett,	2 00
Second, George S. Harwood,	1 00
Any other variety, C. F. Curtis, Souvenir du Congrès,	2 00
Second, Warren Fenno, Esperine,	1 00
PLUMS, — Not less than four varieties, Horace Eaton,	3 00
Second, John B. Moore & Son,	2 00
Any other variety, Horace Eaton, Washington,	2 00
Second, John B. Moore & Son, Washington,	1 00

NATIVE GRAPES. — Six bunches of Moore's Early, John B. Moore & Son, ... $2 00
Second, B. G. Smith, ... 1 00
Any other variety, J. W. Talbot, Cottage, ... 2 00

Gratuities: —

M. W. Chadbourne, Apples and Pears, ... 1 00
B. Judkins, Crab Apples, ... 1 00
A. S. McIntosh, Pears and Blackberries, ... 1 00
G. V. Fletcher, Peaches, ... 1 00
S. Hartwell, Plums, ... 1 00
Horace Partridge, Grapes, ... 1 00

ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

Special Prizes.

Twelve Gravenstein Apples, Samuel Hartwell, ... $5 00
Twelve Bartlett Pears, Charles F. Curtis, ... 5 00
Twelve bunches of Native Grapes, John B. Moore & Son, Moore's Early, ... 5 00
For the heaviest and best ripened bunch of any Foreign Black Grape not less than five pounds, David Allan, Black Hamburg (five and one-fourth pounds), ... 8 00

Regular Prizes.

APPLES. — Baldwin, C. W. Grant, ... 3 00
Second, William A. Morse, ... 2 00
Third, Benjamin G. Smith, ... 1 00
Danvers Sweet, Charles N. Brackett, ... 2 00
Second, Warren Fenno, ... 1 00
Dutch Codlin, B. G. Smith, ... 2 00
Second, Horace Partridge, ... 1 00
Fall Orange or Holden, Asa Clement, ... 2 00
Second, Edward Sumner, ... 1 00
Fameuse, B. G. Smith, ... 2 00
Second, George V. Fletcher, ... 1 00
Foundling, Asa Clement, ... 3 00
Second, B. G. Smith, ... 2 00
Third, O. B. Hadwen, ... 1 00
Golden Russet, L. W. Weston, ... 2 00
Second, Warren Fenno, ... 1 00
Gravenstein, Samuel Hartwell, ... 3 00
Second, John B. Moore & Son, ... 2 00
Third, Asa Clement, ... 1 00
Hubbardston, Austin Ward, ... 3 00

Second, Samuel Hartwell,	$2 00
Third, M. W. Chadbourne,	1 00
Hunt Russet, William H. Hunt,	2 00
Second, B. G. Smith,	1 00
Lady's Sweet, Asa Clement,	2 00
Leicester, O. B. Hadwen,	2 00
Second, A. A. Hixon,	1 00
Lyscom, A. A. Hixon,	2 00
Second, O. B. Hadwen,	1 00
Maiden's Blush, Warren Fenno,	2 00
Second, Horace Eaton,	1 00
Mother, E. W. Wood,	2 00
Second, Asa Clement,	1 00
Northern Spy, George C. Rice,	3 00
Second, William C. Eustis,	2 00
Third, John B. Moore & Son,	1 00
Porter, C. N. Brackett,	2 00
Second, C. W. Grant,	1 00
Pumpkin Sweet, B. G. Smith,	2 00
Second, Asa Clement,	1 00
Rhode Island Greening, Horace Eaton,	3 00
Second, C. N. Brackett,	2 00
Third, E. W. Wood,	1 00
Roxbury Russet, Mrs. M. T. Goddard,	3 00
Second, John L. D'Wolf,	2 00
Third, B. G. Smith,	1 00
Tolman's Sweet, Josiah Crosby,	3 00
Second, Asa Clement,	2 00
Third, J. T. Foster,	1 00
Tompkins King, George C. Rice,	2 00
Second, William A. Morse,	1 00
Washington Royal or Palmer, O. B. Hadwen,	2 00
Second, Josiah Crosby,	1 00
Washington Strawberry, George C. Rice,	2 00
Second, Warren Fenno,	1 00
Any other variety, John B. Moore & Son, Sparhawk,	2 00
Second, George C. Rice, Oldenburg,	1 00
Crab Apples. — Hyslop, M. W. Chadbourne,	2 00
Second, B. Judkins,	1 00
Oblong, M. W. Chadbourne,	2 00
Second, Horace Partridge,	1 00
Transcendent, Cephas H. Brackett,	2 00
Second, Mrs. D. H. Brown,	1 00
Pears. — Angouleme, W. S. Janvrin,	3 00
Second, John McClure,	2 00
Third, Charles F. Curtis,	1 00
Anjou, Mrs. Mary Langmaid,	3 00
Second, H. Barker,	2 00

Third, Charles F. Curtis,	$1 00
Bartlett, W. S. Janvrin,	3 00
Second, William Richardson,	2 00
Third, Charles F. Curtis,	1 00
Belle Lucrative, Horace Eaton,	2 00
Second, B. C. Vose,	1 00
Bosc, George S. Harwood,	3 00
Second, William Richardson,	2 00
Third, Charles F. Curtis,	1 00
Boussock, George S. Harwood,	2 00
Second, O. B. Hadwen,	1 00
Clairgeau, W. P. Plimpton,	3 00
Second, John L. D'Wolf,	2 00
Third, William T. Hall,	1 00
Comice, George S. Harwood,	2 00
Second, W. P. Walker,	1 00
Dana's Hovey, John L. D'Wolf,	3 00
Second, E. W. Wood,	2 00
Third, George Frost,	1 00
Diel, John L. D'Wolf,	2 00
Second, B. G. Smith,	1 00
Goodale, O. B. Hadwen,	2 00
Second, Marshall P. Wilder,	1 00
Hardy, Charles F. Curtis,	2 00
Second, C. M. Hovey,	1 00
Howell, W. S. Janvrin,	2 00
Second, B. G. Smith,	1 00
Lawrence, William T. Hall,	2 00
Second, John Fillebrown,	1 00
Louise Bonne of Jersey, Charles L. Fowle,	2 00
Second, Mrs. Mary Langmaid,	1 00
Marie Louise, Walker & Co.,	2 00
Second, Warren Fenno,	1 00
Merriam, Charles F. Curtis,	2 00
Second, John L. D'Wolf,	1 00
Onondaga, W. P. Walker,	2 00
Second, Warren Fenno,	1 00
Paradise, C. M. Hovey,	2 00
Second, William A. Crafts,	1 00
Seckel, George S. Harwood,	3 00
Second, H. Barker,	2 00
Third, William H. Hunt,	1 00
Sheldon, George S. Harwood,	3 00
Second, Charles F. Curtis,	2 00
Third, John L. D'Wolf,	1 00
Souvenir du Congrès, William Everett,	2 00
Second, William T. Hall,	1 00
St. Michael Archangel, Jesse Haley,	2 00

Second, T. M. Davis,	$1 00
Superfin, E. W. Wood,	2 00
Second, J. C. Park,	1 00
Urbaniste, Warren Fenno,	2 00
Second, Horace Partridge,	1 00
Vicar, Warren Fenno,	2 00
Second, A. S. McIntosh,	1 00
Winter Nelis, T. M. Davis,	2 00
Second, W. P. Walker,	1 00
Any other variety, Warren Fenno, Adams,	2 00
Second, Marshall P. Wilder, Clapp's Favorite,	1 00
PEACHES.—Any variety, A. S. McIntosh, Highland Seedling,	2 00
NECTARINES.—Any variety, Warren Fenno, Revere,	2 00
PLUMS.—Not less than four varieties, John B. Moore & Son,	4 00
Second, Horace Eaton,	3 00
Third, Samuel Hartwell,	2 00
Any one variety, John B. Moore & Son, Duane's Purple,	2 00
Second, John B. Moore & Son, Pond's Seedling,	1 00
NATIVE GRAPES. — Brighton, Joseph S. Chase,	2 00
Concord, William Doran & Son,	2 00
Delaware, John B. Moore & Son,	2 00
Second, Cephas H. Brackett,	1 00
Massasoit, Joseph S. Chase,	2 00
Second, John B. Moore & Son,	1 00
Moore's Early, John B. Moore & Son,	2 00
Second, Charles P. Williams,	1 00
Wilder, John B. Moore & Son,	2 00
Second, Marshall P. Wilder,	1 00
Worden, G. W. Jameson,	2 00
Second, Samuel Hartwell,	1 00
Any other variety, B. G. Smith, Ives's Seedling,	2 00
Second, B. G. Smith, Hartford,	1 00
FOREIGN GRAPES. — Four varieties, two bunches each, David Allan,	8 00
Second, John S. Farlow,	6 00
Third, E. H. Luke,	4 00
Two bunches of Black Hamburg, David Allan,	4 00
Second, George Higginson,	3 00
Third, John S. Farlow,	2 00
Two bunches of Wilmot's Hamburg, George Higginson,	4 00
Second, John S. Farlow,	3 00
Third, David Allan,	2 00
Two bunches of Muscat of Alexandria, David Allan,	5 00
Second, John S. Farlow,	4 00
Two bunches of any other variety, David Allan, Cannon Hall,	5 00
Second, George Higginson, Wilmot's No. 16,	4 00
Third, John S. Farlow, Pope's Hamburg,	3 00
CRANBERRIES. — Half-peck, C. W. Grant,	2 00

Gratuities: —

C. W. Grant, Apples,	$2 00
Frederic Lamson, Apples,	1 00
M. W. Chadbourne, Apples and Pears,	3 00
B. G. Smith, " "	3 00
Warren Fenno, " "	3 00
William A. Morse, " "	1 00
William A. Crafts, " "	1 00
Marshall P. Wilder, Pears,	3 00
I. D. White, "	2 00
C. N. Brackett, "	2 00
John L. Bird, "	1 00
C. M. Hovey & Co., "	2 00
Mrs. A. M. Winn, "	2 00
Mrs. Moses Darling, "	1 00
N. D. Harrington, Peaches and Pears,	3 00
Horace Partridge, Pears and Grapes,	2 00
J. S. Farlow, Foreign Grapes,	3 00
H. L. Barnes, Osage Oranges,	1 00

SEPTEMBER 27.

Gratuities: —

John B. Moore & Son, Hayes Grapes,	1 00
N. D. Harrington, Peaches,	2 00
D. W. Lothrop, Seedling Pears,	1 00

OCTOBER 4.

APPLES. — Fall Orange or Holden, Samuel Hartwell,	2 00
Second, C. E. Grant,	1 00
Gravenstein, Samuel Hartwell,	2 00
Second, John B. Moore & Son,	1 00
Mother, Warren Fenno,	2 00
Second, B. G. Smith,	1 00
Porter, A. S. McIntosh,	2 00
Second S. G. Damon,	1 00
Any other variety, S. Story, Washington Strawberry,	2 00
Second, M. W. Chadbourne, Hubbardston,	1 00
PEARS, Angouleme, John McClure,	2 00
Second, S. G. Damon,	1 00
Bosc, George S. Harwood,	2 00
Second, William Richardson,	1 00
Clairgeau, W. P. Plimpton,	2 00
Second, S. G. Damon,	1 00
Comice, Horace Eaton,	2 00
Second, A. T. Brown,	1 00
Louise Bonne of Jersey, T. M. Davis,	2 00
Second, William Richardson,	1 00

Seckel, the second prize to George S. Harwood,	$1 00
Sheldon, George S. Harwood,	2 00
Second, S. G. Damon,	1 00
Superfin, S. G. Damon,	2 00
Urbaniste, S. G. Damon,	2 00
Second, A. T. Brown,	1 00
Any other variety, J. W. Talbot, President Clark,	2 00
Second, T. M. Davis, St. Michael Archangel,	1 00
NATIVE GRAPES. — Brighton, B. G. Smith,	2 00
Second, Samuel Hartwell,	1 00
Concord, William H. Hunt,	2 00
Second, William Doran & Son,	1 00
Delaware, B. G. Smith,	2 00
Second, Joseph S. Chase,	1 00
Iona, S. G. Damon,	2 00
Second, John B. Moore & Son,	1 00
Isabella, J. V. Wellington,	2 00
Second, George W. Jameson,	1 00
Massasoit, Joseph S. Chase,	2 00
Second, John B. Moore & Son,	1 00
Moore's Early, John B. Moore & Son,	2 00
Second, Samuel Hartwell,	1 00
Prentiss, Joseph S. Chase,	2 00
Wilder, John B. Moore & Son,	2 00
Second, Joseph S. Chase,	1 00
Any other variety, A. M. Chandler, King,	2 00
Second, B. G. Smith, Eumelan,	1 00
FOREIGN GRAPES. — Two bunches of any variety, Horace Partridge,	3 00
Second, Horace Partridge, Red Chasselas,	2 00

Gratuities: —

Edward Sumner, Apples,	2 00
J. C. McNeil, "	1 00
C. N. Brackett, Apples and Pears,	1 00
C. E. Grant, " "	1 00
A. S. McIntosh, " "	1 00
S. G. Damon, Pears,	1 00
Marshall P. Wilder, twenty-five varieties of Grapes,	3 00
John B. Moore & Son, Collection,	1 00
M. W. Chadbourne, Collection,	1 00
Warren Fenno, Collection,	1 00
A. D. Capen, Pears,	1 00
A. T. Brown, "	2 00

OCTOBER 11.

Gratuity: —

A. McDermott, Pears,	1 00

OCTOBER 25.

Gratuities: —

N. D. Harrington, Pears,	$1 00
Horace Partridge, Foreign Grapes,	1 00
S. G. Stone, Isabella Grapes,	1 00

CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

French Premiums.

APPLES. — Baldwin, B. G. Smith,	$2 00
Second, C. W. Grant,	1 00
Danvers Sweet, C. N. Brackett,	2 00
Second, Warren Fenno,	1 00
Hubbardston, George C. Rice,	2 00
Second, Samuel Hartwell,	1 00
Hunt Russet, James Garty,	2 00
Second, William H. Hunt,	1 00
Northern Spy, George C. Rice,	2 00
Second, W. C. Eustis,	1 00
Rhode Island Greening, W. P. Plimpton,	2 00
Second, C. N. Brackett,	1 00
Roxbury Russet, Edward Sumner,	2 00
Second, Mrs. M. T. Goddard,	1 00
Tolman's Sweet, George C. Rice,	2 00
Second, Josiah Crosby,	1 00
Tompkins King, George C. Rice,	2 00
Second, John Parker,	1 00

Society's Prizes.

PEARS. — Angouleme, S. G. Damon,	2 00
Second, N. D. Harrington,	1 00
Anjou, A. S. McIntosh,	2 00
Second, S. G. Damon,	1 00
Comice, Warren Fenno,	2 00
Second, W. P. Walker,	1 00
Dana's Hovey, Jesse Haley,	2 00
Second, S. G. Damon,	1 00
Glout Morceau, Edwin A. Hall,	2 00
Second, A. S. McIntosh,	1 00
Josephine of Malines, Warren Fenno,	2 00
Second, B. G. Smith,	1 00
Langelier, Warren Fenno,	2 00
Second, A. S. McIntosh,	1 00
Lawrence, A. McDermott,	2 00
Second, Warren Fenno,	1 00

Vicar, W. P. Walker,	$2 00
Second, Walker & Co.,	1 00
Winter Nelis, A. McDermott,	2 00
Second, T. M. Davis,	1 00
Any other variety, George H. Dickerman, Sheldon,	2 00
Second, M. W. Chadbourne, Bosc,	1 00

Gratuities : —

Warren Fenno, Apples and Pears,	1 00
S. G. Damon, Pears,	1 00
John B. Moore & Son, Grapes,	1 00
David Allan, Foreign Grapes,	2 00
M. W. Chadbourne, Collection,	1 00
C. W. Grant, "	1 00
B. G. Smith, "	1 00

REPORT

OF THE

COMMITTEE ON VEGETABLES,

FOR THE YEAR 1884.

By CHARLES N. BRACKETT, Chairman.

The spring of 1884 opened unfavorably for the work of the farm and garden. During the earlier portion of the season the frequent rain rendered the soil cold, wet, and backward, thereby causing the cultivator considerable trouble and delay in the preparation of the ground and subsequent sowing of seeds.

The Schedule of Prizes having been arranged to conform to average seasons, many of our early exhibitions were perhaps not as good as they would have been had the prizes at some of them been a week or two later. Such vegetables as Peas, Beans, Tomatoes, and Sweet Corn were at least from one to two weeks later than last season. The first exhibition of Peas was made by Samuel Hartwell and M. W. Chadbourne, on the 21st of June. Sweet Corn did not make its appearance on our table until July 26, and the first specimens of Tomatoes of out-door growth were not shown until the fourth Saturday in July, which was about two weeks later for them than the previous year.

The exhibitions during the year, taken as a whole, have, however, been very satisfactory, and, we think, up to the average of previous years in quality if not in quantity. Many of the prizes have been more largely competed for than in previous years, and a good degree of interest has been manifested by contributors to this department throughout the year.

Forced specimens of Cucumbers, Lettuce, Radishes, Mushrooms,

Dandelions, and Tomatoes assisted to make the shows quite interesting during the winter and early spring months. For these contributions we are mainly indebted to Josiah Crosby, Cephas H. Brackett, Warren Heustis, Walter Russell, and George F. Stone. In the Schedule of Prizes for the coming year we are pleased to be able to state that, owing to an increase in our appropriation, arrangements have been made for a list of prizes for forced vegetables on the first Saturdays of January and February respectively. This is a new departure, no prizes having before been offered for these objects previous to the opening or Spring Exhibition, which occurs on the 19th and 20th of March. It is hoped that these premiums will have a tendency to create a more lively competition and bring out a larger and much more interesting exhibit of the various articles for which these prizes are offered than has heretofore been shown under the old system of gratuities only. We have among our members quite a large number who are successfully engaged in the growing of vegetables under glass, and we trust, now that some encouragement is offered in the way of prizes, that they may be induced to exhibit specimens of their skill the coming season, and by so doing add increased interest to this branch of our exhibitions, which has already been too long neglected.

The numerous attempts at improvement by raising new varieties of Peas which have recently been made have resulted in some instances in eminent success. Bliss's American Wonder, for example, is a decided acquisition, and, up to the present time, stands unrivalled in point of flavor, quality, and productiveness, and is, without exception, the earliest wrinkled pea in cultivation. Bliss's Abundance and Bliss's Everbearing are two new varieties, exhibited here for the first time the past season, by B. K. Bliss & Sons, of New York, July 26. The specimens consisted of a single vine of each variety, as taken from the field, with its entire crop. The stalk of Everbearing had on it seventy-five and the Abundance seventy-one pods by actual count, the product in each case of a single pea. It will thus be seen that both are remarkably productive. The vine of the Everbearing was filled from top to bottom with good sized pods in all stages of growth, from small pods just formed up to those containing peas which were fully ripe. This pea will undoubtedly prove of more value to the amateur than the market gardener, on account of its habit of continuing so long in bearing. At the Rose and Strawberry Show, June

24, the first, second, and third prizes were all awarded for Bliss's American Wonder.

Considerable attention is still being paid to the improvement of the Potato, and many new varieties have been lately introduced, some of which are great improvements on many of the older sorts. During the past year the attention of the Committee has been called for the first time to the Pearl of Savoy, as one of the finest and best of the varieties of recent introduction, and we think it deserving of special mention, on account of its earliness, superior quality, and great productiveness. It has been grown quite extensively the past season by a large number of our contributors, all of whom speak of its good qualities in terms of the highest praise. Further trial however is recommended before coming to any decision as to the rank it should ultimately occupy.

At the weekly exhibitions, as before remarked, the number of exhibitors during the earlier part of the season was perhaps somewhat less than at the shows of the same period in the previous year; while later in the season any deficiency in this respect was entirely overcome. In the quality of the specimens, however, there was not at any time any falling off, many of them being particularly fine. The display of Tomatoes at the Annual Show was never surpassed at any previous exhibition of the Society, and has rarely, if ever, been equalled. Of the upwards of eighty different dishes on our tables at this show, it was a somewhat remarkable fact that not a single dish of poor specimens was to be found in the entire collection. The leading varieties were Acme, Emery, and Paragon.

At the Annual Exhibition the collection of Potatoes numbered sixty dishes. The quantity was not so large as at the same exhibition of the previous year, but in quality they have not often been surpassed. Among the newer kinds, the Advance and Pearl of Savoy already take high rank as to quality and yield. The first prize for the best four varieties was awarded to Mrs. M. T. Goddard. The first prizes for the best single dishes of Clark, Hebron, and Rose were all taken by C. B. Lancaster.

The Special Prize for the best collection of Seedling Potatoes was awarded to J. J. H. Gregory.

Cauliflowers unfortunately afford little opportunity for remark. The only specimens shown were those by W. W. Rawson, which were hardly up to the usual standard.

The amount appropriated for vegetables for the past year, including the income of the Whitcomb fund, was $580. The Committee

have awarded in prizes and gratuities $550, leaving an unexpended balance of $30.

With the annexed list of awards, made by your Committee the past year, they respectfully submit this report as containing a full account of their doings.

C. N. BRACKETT, *Chairman.*

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES.

JANUARY 19.

Gratuity :—

Josiah Crosby, Celery, ... $2 00

JANUARY 26.

Gratuity : —

Josiah Crosby, Celery, ... 2 00

FEBRUARY 2.

Gratuity : —

Warren Heustis, Celery, ... 1 00

FEBRUARY 9.

Gratuity : —

I. E. Coburn, Rhubarb, ... 1 00

FEBRUARY 16.

Gratuities : —

C. H. Brackett, Mushrooms and Rhubarb, ... 2 00
Walter Russell, Radishes, ... 1 00

FEBRUARY 23.

Gratuities : —

George F. Stone, Dandelions and Radishes, ... 1 00
C. H. Brackett, Mushrooms and Rhubarb, ... 1 00

MARCH 1.

Gratuity :—

C. H. Brackett, Mushrooms, ... 1 00

MARCH 8.

Gratuities : —

Josiah Crosby, Lettuce and Radishes, ... 2 00
C. H. Brackett, Mushrooms and Cucumbers, ... 2 00

MARCH 15.

Gratuities : —

C. H. Brackett, Cucumbers, ... 1 00
Josiah Crosby, Radishes and Lettuces, ... 2 00

AZALEA AND ROSE EXHIBITION.

March 20.

Radishes. — Four bunches of Turnip Rooted, William D. Philbrick,	$3 00
Second, Josiah Crosby,	2 00
Third, George F. Stone,	1 00
Long Scarlet, George Hill,	3 00
Second, W. D. Philbrick,	2 00
Cucumbers. — Pair of White Spine, C. H. Brackett,	3 00
Lettuce. — Four heads of Tennisball, Josiah Crosby,	3 00
Second, George Hill,	2 00
Third, W. D. Philbrick,	1 00
Dandelions. — Peck, George F. Stone,	2 00
Parsley. — Two quarts, W. D. Philbrick,	2 00
Second, C. H. Brackett,	1 00
Gratuities: —	
C. H. Brackett, Cucumbers,	1 00
Francis B. Hayes, Mushrooms,	1 00
A. S. McIntosh, Artichokes,	1 00

March 29.

Gratuity: —

C. H. Brackett, Cucumbers, Tomatoes, and Mushrooms,	2 00

April 5.

Gratuity: —

C. H. Brackett, Cucumbers,	1 00

April 19.

Gratuity: —

C. H. Brackett, Collection,	2 00

May 3.

Gratuity: —

C. H. Brackett, Cucumbers,	1 00

May 10.

Asparagus. — Four bunches, twelve stalks each, John B. Moore,	2 00
Rhubarb. — Twelve stalks, Aaron D. Capen,	2 00
Second, Mrs. E. M. Gill,	1 00
Cucumbers. — Pair, C. H. Brackett, Brighton,	2 00
Second, C. H. Brackett, White Spine,	1 00
Gratuities: —	
C. H. Brackett, Tomatoes,	1 00
Samuel Hartwell, Asparagus,	1 00
Warren Heustis, Dandelions,	1 00

MAY 17.

Gratuities : —

Samuel Hartwell, Asparagus,	$1 00
Warren Heustis, Spinach,	1 00
M. W. Chadbourne, Rhubarb,	1 00

MAY 24.

Gratuities : —

Josiah Crosby, Collection,	3 00
C. H. Brackett, "	2 00
John B. Moore & Son, Asparagus,	2 00
Samuel Hartwell, "	1 00
Warren Heustis, Spinach,	1 00

JUNE 7.

CARROTS. — Twelve Short Scarlet, J. Crosby,	2 00
RADISHES. — Four bunches of Turnip Rooted, J. Crosby,	2 00
ASPARAGUS. — Four bunches, twelve stalks each, John B. Moore & Son,	2 00
Second, L. W. Weston,	1 00
RHUBARB. — Twelve stalks, C. H. Brackett,	2 00
Second, M. W. Chadbourne,	1 00
CUCUMBERS. — Pair, E. W. Wood,	2 00
Second, Josiah Crosby,	1 00
LETTUCE. — Four heads, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00

Gratuities : —

C. H. Brackett, Tomatoes,	1 00
Josiah Crosby, Lettuce,	1 00
Warren Heustis, Onions,	1 00
Samuel Hartwell, Asparagus,	1 00

JUNE 21.

Gratuities : —

Samuel Hartwell, Peas,	1 00
M. W. Chadbourne, Breck's Excelsior Peas,	1 00

ROSE AND STRAWBERRY SHOW.

JUNE 24.

Whitcomb Prizes.

BEETS. — Twelve specimens of Turnip Rooted, Warren Heustis,	$2 00
Second, John Fillebrown,	1 00
Egyptian, J. Crosby,	2 00
Second, Warren Heustis,	1 00
CARROTS. — Twelve Intermediate, Josiah Crosby,	2 00

Onions. — Twelve specimens, Josiah Crosby,	$2 00
Second, John Fillebrown,	1 00
Cucumbers. — Pair of White Spine, James Baird,	2 00
Second, Josiah Crosby,	1 00
Lettuce. — Four heads, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00
Peas. — Half-peck, John L. Gardner, American Wonder,	3 00
Second, S. G. Stone, " "	2 00
Third, E. W. Wood, " "	1 00

Gratuities: —

Lewis H. Farlow, Lettuce,	1 00
E. W. Wood, Tomatoes,	2 00
C. H. Brackett, Tomatoes and Rhubarb,	2 00
M. W. Chadbourne, Collection of Peas,	1 00
W. G. Prescott, Peas,	1 00
W. Heustis, Radishes,	1 00

July 5.

Onions. — Twelve specimens, Josiah Crosby,	2 00
Second, Warren Heustis,	1 00
Squashes. — Four Long Warted, Warren Heustis,	2 00
Cabbages. — Four, Warren Heustis, Henderson's,	2 00
Beans. — Half-peck of String, Samuel G. Stone, Marblehead,	2 00
Peas. — Half-peck, S. G. Stone, Advancer,	2 00
Second, M. B. Faxon, American Wonder,	1 00

Gratuity: —

Josiah Crosby, Summer Squashes,	1 00

July 12.

Potatoes. — Twelve specimens, C. N. Brackett, Clark,	3 00
Second, C. Terry, Clark,	2 00
Third, M. W. Chadbourne, Weetomac,	1 00

Gratuities: —

John L. Gardner, Collection of Peas,	2 00
C. N. Brackett, Bliss's Abundance Peas,	1 00
M. W. Chadbourne, Wax Beans,	1 00

July 19.

Cabbages. — Four Drumhead, Warren Heustis,	3 00

Gratuities: —

C. H. Brackett, Potatoes and Cabbages,	2 00
C. N. Brackett, Clark Potatoes,	1 00
Warren Heustis, Peas and Beans,	1 00
Samuel G. Stone, two varieties of Beans,	1 00
J. L. Gardner, Cauliflowers,	1 00

JULY 26.

SQUASHES. — Four Marrow, Josiah Crosby,	$3 00
SWEET CORN. — Twelve ears, Samuel G. Stone, Peerless,	3 00
Second, Samuel Hartwell, Marblehead,	2 00
Third, C. N. Brackett, "	1 00

Gratuities: —

C. H. Brackett, Potatoes and Cabbages,	2 00
C. N. Brackett, Cranberry Beans,	1 00
B. K. Bliss & Sons, for new varieties of Peas, Bliss's Abundance and Bliss's Everbearing, Silver Medal.	

AUGUST 2.

SQUASHES. — Four Marrow, Josiah Crosby,	2 00
SWEET CORN. — Twelve ears, L. W. Weston, Weston's Early Sweet,	2 00
Second, Samuel Hartwell, Marblehead,	1 00
TOMATOES. — Twelve specimens, George Hill, Emery,	3 00
Second, C. N. Brackett, Acme,	2 00

Gratuities: —

Samuel Hartwell, Hebron Potatoes,	1 00
C. H. Brackett, Mushrooms,	1 00
M. W. Chadbourne, Corn,	1 00
C. N. Brackett, Marblehead Corn,	1 00

AUGUST 9.

GREENFLESH MELONS. — Four specimens, H. C. Woods,	3 00
TOMATOES. — Twelve Acme, C. N. Brackett,	2 00
Emery, C. N. Brackett,	2 00
Any other variety, C. N. Brackett, Perfection,	2 00
EGG PLANTS. — Four Round Purple, J. G. Coolidge,	3 00

Gratuities: —

S. G. Stone, Collection,	2 00
Samuel Hartwell, Tomatoes and Corn,	1 00
Horace Eaton, Bell Peppers,	1 00
M. W. Chadbourne, Crosby Corn,	1 00

AUGUST 16.

EGG PLANTS. — Four Round Purple, J. G. Coolidge,	2 00

Gratuities: —

C. N. Brackett, Three varieties of Tomatoes,	2 00
Mrs. W. Houseman, Kohl Rabi and Beans,	1 00
Samuel Hartwell, Corn and Tomatoes,	1 00
H. S. Messenger, Cucumbers,	1 00
John L. Bird, Tomatoes,	1 00

AUGUST 23.

POTATOES. — Twelve specimens, Samuel Hartwell, Hebron, . . $2 00
Second, L. W. Weston, Pearl of Savoy, ... 1 00
BEANS. — Two quarts of Large Lima, Benjamin G. Smith, . . 2 00
PEPPERS. — Twelve specimens, J. G. Coolidge, ... 2 00
Second, C. N. Brackett, ... 1 00

Gratuities: —

George Hill, Greenflesh Melons, ... 1 00
Samuel Hartwell, Cauliflowers and Tomatoes, ... 2 00
C. N. Brackett, Tomatoes and Peppers, ... 1 00

AUGUST 30.

WATERMELONS. — Pair, Samuel Hartwell, Cuban Queen, . . 3 00
GREENFLESH MELONS. — Four, Samuel Hartwell, ... 3 00
Second, C. E. Grant, ... 2 00

Gratuities: —

Samuel Hartwell, Collection, ... 3 00
C. E. Grant, " 2 00
James Claffy, Rose Potatoes, ... 1 00
C. N. Brackett, Tomatoes and Peppers, ... 1 00

SEPTEMBER 6.

CAULIFLOWERS. — Four specimens, Samuel Hartwell, . . . 3 00
CELERY. — Four roots, George D. Moore, ... 3 00
Second, Josiah Crosby, ... 2 00

Gratuities: —

Samuel Hartwell, Collection, ... 4 00
Samuel G. Stone, " 2 00
C. E. Grant, " 2 00
C. N. Brackett, " 2 00
John B. Moore & Son, Perfection Tomatoes, ... 1 00
Aaron D. Capen, " " 1 00

ANNUAL EXHIBITION.

SEPTEMBER 16, 17, 18, AND 19.

Special Prizes.

POTATOES. — Best Collection of New Seedling varieties, J. J. H. Gregory, Harris's Treatise on Insects.
CAULIFLOWERS. — Best four specimens, and best kept during the exhibition, W. W. Rawson, ... $5 00
CELERY. — Best four specimens, and best kept during the exhibition, W. W. Rawson, ... 5 00

Regular Prizes.

BEETS. — Twelve Turnip Rooted, W. W. Rawson,	$3 00
Second, Walter Russell,	2 00
Third, John Fillebrown,	1 00
CARROTS. — Twelve Long Orange, W. W. Rawson,	3 00
Second, John L. D'Wolf,	2 00
Intermediate, George Hill,	3 00
Second, George F. Stone,	2 00
Third, Walter Russell,	1 00
PARSNIPS. — Twelve Long, John L. D'Wolf,	3 00
Second, John Fillebrown,	2 00
Third, George D. Moore,	1 00
POTATOES. — Four varieties, twelve specimens each, Mrs. M. T. Goddard,	4 00
Second, C. N. Brackett,	3 00
Third, Samuel Hartwell,	2 00
Clark, C. B. Lancaster,	3 00
Second, Mrs. M. T. Goddard,	2 00
Third, Samuel Hartwell,	1 00
Hebron, C. B. Lancaster,	3 00
Second, Mrs. M. T. Goddard,	2 00
Third, S. A. Merrill,	1 00
Rose, C. B. Lancaster,	3 00
Second, Mrs. M. T. Goddard,	2 00
Third, L. W. Weston,	1 00
Any other variety, J. J. H. Gregory, Early Maine,	3 00
Second, H. C. Bowers, Pearl of Savoy,	2 00
Third, C. N. Brackett, Advance,	1 00
SALSIFY. — Twelve specimens, Charles F. Curtis,	3 00
Second, George Hill,	2 00
Third, John L. D'Wolf,	1 00
TURNIPS. — Twelve Flat, Walter Russell,	3 00
Second, George F. Stone,	2 00
Third, George H. Rich,	1 00
Swedish, Mrs. M. T. Goddard,	3 00
Second, George F. Stone,	2 00
ONIONS. — Twelve Danvers, George D. Moore,	3 00
Second, George Hill,	2 00
Third, Walter Russell,	1 00
Portugal, Walter Russell,	3 00
Second, Josiah Crosby,	2 00
Red, Walter Russell,	3 00
Second, J. J. H. Gregory,	2 00
GREENFLESH MELONS. — Four specimens, George W. Pierce,	3 00
Second, Warren Heustis,	2 00
Third, Samuel Hartwell,	1 00
MUSKMELONS. — Four specimens, M. W. Chadbourne,	3 00
WATERMELONS. — Two specimens, Samuel Hartwell,	3 00

SQUASHES. — Four Canada, Josiah Pratt,	$3 00
Second, Warren Fenno,	2 00
Third, Mrs. M. T. Goddard,	1 00
Hubbard, George Hill,	3 00
Second, W. W. Rawson,	2 00
Third, Samuel Hartwell,	1 00
Marrow, George Hill,	3 00
Second, W. W. Rawson,	2 00
Third, Warren Heustis,	1 00
Marblehead, J. J. H. Gregory,	3 00
Second, Walter Russell,	2 00
Perfect Gem, Mrs. M. T. Goddard,	3 00
Second, M. W. Chadbourne,	2 00
Turban, Samuel Hartwell,	3 00
Second, W. W. Rawson,	2 00
Third, Walter Russell,	1 00
CABBAGES. — Three Drumhead, C. B. Lancaster,	3 00
Second, Samuel Hartwell,	2 00
Third, George F. Stone,	1 00
Red, Samuel Hartwell,	3 00
Savoy, Samuel Hartwell,	3 00
Second, C. B. Lancaster,	2 00
Third, W. D. Philbrick,	1 00
CAULIFLOWERS. — Four specimens, W. W. Rawson,	3 00
CELERY. — Four roots, best kept during the exhibition, W. D. Philbrick,	3 00
Second, George D. Moore,	2 00
Third, W. W. Rawson,	1 00
ENDIVE. — Four specimens, George W. Pierce,	2 00
Second, Stillman S. Hovey,	1 00
HORSERADISH. — Six roots, Walter Russell,	3 00
Second, John Fillebrown,	2 00
Third, W. W. Rawson,	1 00
BEANS. — Two quarts Large Lima, Samuel G. Stone,	3 00
Second, Benjamin G. Smith,	2 00
Third, George Hill,	1 00
CORN. — Twelve ears of Sweet, S. A. Merrill,	3 00
Second, L. W. Weston,	2 00
Third, Samuel Hartwell,	1 00
Yellow or Field, twenty-five ears traced, Mrs. M. T. Goddard,	3 00
Second, Horace Eaton,	2 00
EGG PLANTS. — Four Round Purple, J. G. Coolidge,	3 00
Second, George D. Moore,	2 00
Third, Walter Russell,	1 00
TOMATOES. — Three varieties, twelve specimens each, C. E. Grant,	4 00
Second, George H. Rich,	3 00
Third, C. N. Brackett,	2 00
Acme, Twelve specimens, C. N. Brackett,	2 00

Second, Samuel Hartwell,	$1 00
Emery, George Hill,	2 00
Second, G. W. Pierce,	1 00
Paragon, Walter Russell,	2 00
Second, Samuel Hartwell,	1 00
Perfection, George W. Pierce,	2 00
Second, Walter Russell,	1 00
Any other variety, C. F. Curtis, Livingston's,	2 00
Second, A. D. Capen, Mountain Rose,	1 00
MARTYNIAS. — Twenty-four specimens, M. W. Chadbourne,	2 00
Second, Starkes Whiton,	1 00
OKRA. — Twenty-four specimens, Mrs. M. T. Goddard,	2 00
PEPPERS. — Twenty-four specimens, C. N. Brackett,	3 00
Second, J. Fillebrown,	2 00
Third, George F. Stone,	1 00
Gratuities : —	
J. J. H. Gregory, Collection,	10 00
G. W. Pierce, "	1 00
Walter Russell, "	1 00
Walter Russell, Banana Melons,	1 00
G. W. Pierce, " "	1 00
C. M. Hovey, Melons,	2 00
Warren Heustis, Squashes and Lettuce,	2 00

OCTOBER 4.

SALSIFY. — Twelve specimens, George Hill,	2 00
BRUSSELS SPROUTS. — Half peck, Mrs. Mary T. Goddard,	2 00
CABBAGES. — Drumhead, three specimens, C. B. Lancaster,	2 00
Second, Samuel Hartwell,	1 00
Red, Samuel Hartwell,	2 00
Second, C. B. Lancaster,	1 00
Savoy, C. B. Lancaster,	2 00
Second, Samuel Hartwell,	1 00
CELERY. — Four roots, Warren Heustis,	2 00
Second, George D. Moore,	1 00
Gratuities : —	
C. N. Brackett, Collection,	2 00
Samuel G. Stone, "	2 00
Benjamin G. Smith, Lima Beans,	1 00
J. H. Woodford, Parsley,	1 00
B. Judkins, Turnips,	1 00
Samuel Hartwell, Watermelons,	1 00

OCTOBER 25.

Gratuities : —	
C. H. Brackett, Cucumbers,	1 00
Samuel G. Stone, Collection,	2 00

NOVEMBER 8.

Gratuity : —

C. H. Brackett, Cucumbers, ... $1 00

CHRYSANTHEMUM SHOW.

NOVEMBER 13 AND 14.

CELERY. — Four roots, Warren Heustis, ... $2 00
Second, Warren W. Rawson, ... 1 00

Gratuities : —

Samuel G. Stone, Lima Beans, ... 1 00
C. H. Brackett, Cucumbers, ... 1 00
George W. Pierce, Endive and Brussels Sprouts, ... 2 00
Samuel Hartwell, Tomatoes, ... 2 00
A. S. McIntosh, Artichokes, ... 1 00

$550 00

REPORT

OF THE

COMMITTEE ON GARDENS,

FOR THE YEAR 1884.

By JOHN G. BARKER, Chairman.

The Committee on Gardens feel much pleasure in being able to report that during the past season they have visited seven places; a greater number than their attention has been called to for several years. Without further preface, beyond the expression of the hope that this gratifying improvement may continue and increase in future years, they proceed to give an account of these visits: —

Pine Hill, the Residence of Hon. Francis B. Hayes.

The first visit of the season was to the grounds of our late President at Lexington. The day was very stormy, and our inspection of the different parts of the grounds was between the showers, as best we could effect it. Little perhaps can be added to the reports already made of frequent visits to this place. The new and enlarged Rhododendron Tent, near the new mansion house, was the special object of attraction; it had been thoroughly rearranged since last season, and everything was in excellent order, except that the plants were perhaps suffering somewhat from too great a supply of water, owing to the unusually wet weather. The large standard specimens mentioned in our previous reports were particularly noticeable, being in fine foliage and bloom. Many new varieties had been added to the collection, among which that named Francis B. Hayes, sent out by Waterer, a very bright and attractive variety, was especially noticeable. The tent contained more than a

hundred and fifty varieties, and, with a few more years' growth on some of the smaller plants, this collection of rhododendrons will be the pride of the place. With the great variety of the colors of the flowers,—from pure white to deep purple,—combined with elegant habit and foliage of the finest and deepest green, they are indispensable alike in the conservatory, flower garden, or shrubbery, and never fail to elicit admiration, whether planted out as single specimens, in groups, or in masses with other plants.

On every hand the results of Mr. Hayes's enthusiasm were visible. His plans for the future development of his large estate were broad and liberal; and little did we think, when on this visit, that it would be the last time we should meet our honored and respected President there, and we feel sure that we utter the sentiment of all who knew him when we express our deep regret that in the full maturity of a life of great usefulness and unfinished work he was so suddenly taken from our midst. Not only our Society but Horticulture generally has lost one of its most energetic and useful promoters.

The Waverly Oaks.

On the 28th of June, the Committee, with other gentlemen, visited the Waverly Oaks, and spent an hour or two in examining those grand old trees. The afternoon was fine, and what might have been of little interest to many persons was much enjoyed by all, especially by some who have early recollections of very fine trees in Europe. It may not be out of place to copy a few lines from "Harper's Monthly" for January, 1881, vol. 62, page 262. Alluding to Beaver brook, it says: "Not far below is a pasture in which are the well-known Waverly Oaks, the only group of aboriginal trees, probably, standing on the Massachusetts coast. If a bull be permitted, the largest of the oaks is an elm, now unhappily dying at the roots. This tree has a straight outspread of one hundred and twenty feet — sixty feet each way — from the giant trunk. The oaks are seven or eight in number, as like as so many stout brothers, planted on sloping dunes west of the brook. They have a human resolute air. Their great arms look as if ready to 'hit out from the shoulder.' Elms have their graceful ways, willows their pensive attitudes, firs their loneliness, but the aboriginal oaks express the strength and the rugged endurance of nature." This extract gives a good idea of what the trees are, but, instead of seven

or eight, there are twelve or fourteen. A few measurements will give an idea of their size. At three feet from the ground one was nineteen feet in circumference; one, at two feet from the ground, seventeen feet in circumference, and the same tree, at six feet from the ground, thirteen and one half feet. There was also evidence that one which had been at some time cut down, the stump being left, had a circumference of twenty-five feet at three feet from the ground. The species seems to be the white oak (*Quercus alba*). They are located on either side of a somewhat abrupt slope, in a large pasture, and are of easy access from the Waverly Station, on the Fitchburg Railroad. Some of the trees are surrounded by an undergrowth of shrubs; others have only a pasture sward beneath, and present a fine park-like appearance.

Dr. George B. Emerson, in his report on the "Trees and Shrubs Growing Naturally in Massachusetts," says that a white oak which he measured in Greenfield in 1838 was seventeen feet and five inches in circumference just above the root, and fifteen feet and three inches at three feet. A white oak standing nearly opposite Deacon Nurse's, in Bolton, measured in 1840 nineteen feet just above the roots, and fourteen feet at three feet from the ground. Dr. Emerson seems however to have been entirely unacquainted with this remarkable group of trees, since he makes no mention whatever of them.

We cannot close our brief notice of these trees, without expressing the hope that these grand old sentinels, which have been signalized for these many years as perhaps the finest oaks in Massachusetts, if not in the New England States, may be spared from the ruthless woodman's axe, and that the coming generations may enjoy their shade and grandeur, as some of the rising generation were doing at the time of our visit, when we saw little groups here and there with their luncheon spread beneath the shade of these noble trees.

The Committee would acknowledge their obligations to Mr. Elisha N. Pierce, a resident in the vicinity, for guidance and information and other courtesies.

Newton Cemetery.

The Committee, by invitation of Henry Ross, Superintendent, and his assistant, Charles W. Ross, visited these grounds on the 12th of July, and although we were greeted with a very heavy

rain-storm, lasting all day, the barge ride was much enjoyed. Previously to visiting the grounds we found ourselves after a short drive opposite the Newton Public Library, which is beautifully located, being set back a good distance from the street, with a nicely kept lawn in front, and the building itself being covered with the Virginia creeper (*Ampelopsis quinquefolia*), the whole presenting a picturesque and attractive appearance. As we traversed Centre and Franklin streets, many beautiful estates were noticed, among which were the grounds of George C. Lord, which we passed through, and where the fine trees and high keeping fully attested the skill and good taste of the owner. We then entered the grounds of John S. Farlow, who, by his munificent gift to the city of Newton of a tract of ground for a public park, and later of a beautiful chapel and conservatory to Newton Cemetery, has set a worthy example to gentlemen of means in other cities for so using some of the abundance of their possessions as, while living, to see the results of such actions in blessing and benefiting mankind. On the estate of Mr. Farlow is a fine collection of forest trees, — perhaps the best in Newton. The Norway spruces are, we believe, the first that were imported in this vicinity, and they, as well as many other specimens of trees, such as magnolias, beeches, oaks, and many others at which we only got a glance, were planted by our respected and beloved friend, William Kenrick, and stand as noble witnesses of his skill and devotion to the beautiful art of Horticulture. Newton has certainly done a good thing in naming one of its parks Kenrick Park, and we hope that all its adornments may do honor to the name of one who loved all that was beautiful, and whose memory we all cherish. Following along the winding avenues, objects of interest attracted us at every turn; and when we reached the edge of the farm grounds we noticed the crops in a luxuriant condition. Driving to the conservatories, we alighted, and found ourselves at once in a place where neatness and order were the rule. There were many good specimens of choice plants, while the graperies on either side showed the results of good cultivation. A stroll through the gardens, quickly taken, gave additional evidence that neither labor nor expense had been spared to produce the best results. There was a good variety of flowering shrubs, a fine collection of Hybrid Perpetual roses, and many beds of summer decorative plants. We feel that this brief mention hardly does justice to one of the most beautiful suburban places it has been our good fortune to visit. Again on the road, we passed delightful residences on

Sargeant street and Highland avenue; thence through Newtonville, to West Newton, all the way along taste and beauty were displayed, while the delightful views could not be equalled. In passing down Prospect and Washington streets to Auburndale the rain came down in such torrents that it required nearly all our attention to keep ourselves dry, but Mr. Ross called our attention to objects of interest all along. Our next stopping-place was at the elegant residence of E. B. Haskell, which certainly is beautiful for situation, commanding in all directions most magnificent views. The location is a high eminence which, a few years ago, one would hardly have thought could be converted into a place of such combined simplicity and beauty. The well-kept slopes and belts of native trees added much to the beauty of the place, while the hospitality of the host, which was amply tested, added no little to the pleasure of the visit. Once more on the road, through vales and over hills, we soon found ourselves approaching the Cemetery, our attention being first of all drawn to a raised bed composed of succulents and other low-growing plants arranged in geometrical style in excellent taste. A description of the arrangement is impossible, but it was very attractive through the entire season, and seen from a distance, through a vista in approaching the grounds, the effect was charming. It is only justice to say that the rain still prevented us from walking through the grounds, as we had hoped to do, but, under the guidance of Mr. Ross, the objects of interest were pointed out as we passed along. The general improvement of the grounds was very noticeable, great attention being given to retaining all the native trees possible, while many new and rare varieties were being introduced. Those which attracted our attention as being most desirable for ornamental purposes, were

Viburnum aurea.

Aralia Mandshurica.

Cratægus Crus-galli pyracanthifolia pendula, a weeping thorn with small, bright, glossy foliage.

Hydrangea quercifolia, a fine massive shrub.

Sambucus laciniata.

Rhus glabra laciniata, a grand plant for the centre of a sub-tropical bed.

Philadelphus foliis aureis, a grand plant for grouping with other shrubs. The foliage is very striking.

Calluna vulgaris.

Rosa rugosa alba.
Prunus Pissardi.
Spiræa Japonica var. *sempiflorens.*
Exochorda grandiflora.
Red or River Birch.
European White Birch.
Betula alba elegans pendula, one of the best of the weeping trees.
Betula glandulosa nana.
New Weeping Japan Cherry.
Picea pungens.
Abies alba aurea (Maxwell's Glory of the Spruces).
Abies cærulea.
Cupressus orientalis.
Biota orientalis.
Pinus ponderosa.
Retinospora filifera.
Retinospora vireana.

Descriptions of the above can be found in most catalogues. In a few years the trees and shrubs that we have named will become fine specimens, and greatly adorn these grounds; and it is a pleasure to notice that so much attention is being given to introducing trees, shrubs, and plants that will add to the permanent beauty of the Cemetery. We feel it a duty to mention that all through the grounds were many beds of choice plants, that added much to the attractions, and undoubtedly were pleasing in no small degree to very many, yet, when we consider the great amount of care they demand, and the comparatively short season during which we get any benefit from plants that require the protection of the greenhouse for winter, we are glad to note the growing tendency to the cultivation of hardy plants in preference to depending on so many thousands of tender ones for such purposes, and we feel sure that we shall not look in vain to Newton Cemetery for some fine examples. The flowering of a plant of *Agave Verschaffeltii* has been quite an attraction; the flower-stalk, at the time of our visit, had attained a height of six feet, and Mr. Haskell remarked that in Mexico he had seen them twenty feet high. This is the only one that has flowered in this part of the country, as far as known, and, although not beautiful, it is quite rare and interesting. It would be impossible to even mention the many rare plants which are used in the Cemetery. The commodious greenhouses are taxed to their utmost capacity to meet the large demands for plants.

Later in the season we noticed that the changes necessary for the new chapel and conservatory were being pushed rapidly forward by the removal of the old receiving tomb. This place, which is next to Mr. Farlow's lot, has been chosen as a site for the chapel, which will have a conservatory attached, the design being to divide the two by three large arches in the side, with sliding doors, so that the chapel and conservatory may be thrown together, and form one room, when occasion may require. On account of these improvements, much new grading is necessary about the immediate surroundings, which when finished will much improve the grounds.

The Committee were greatly pleased with their visit, and feel that the citizens of Newton are to be congratulated on the possession of one of the most beautiful rural cemeteries in this vicinity; and to the Messrs. Ross we desire to express our thanks for their untiring efforts, which made the visit so pleasant, and we trust that Newton may long enjoy their valuable services.

Garden of Robert T. Jackson.

Our next visit was to the garden of Robert T. Jackson, of Dorchester, which contains one of the best collections of Hardy Plants in this vicinity. The short time spent in examining the collection was of great profit as well as pleasure. At our request Mr. Jackson has given a written statement for publication in the Transactions, which we are sure will be read with much profit. Particular attention is called to his system of labelling, which is the best we have ever seen. Keeping the names of plants with accuracy is one of the most important and difficult cares of a large collection; but Mr. Jackson has surmounted it effectually. It is rare to see so much in so small a place, with such admirable system, and certainly the fact that it does not require a large place to possess an interesting collection of plants has been thoroughly demonstrated, and the wonder is that more have not gone and done likewise. We are glad to introduce Mr. Jackson to the Society through this report.

Mr. Jackson's description of his garden is as follows: —

The garden is an old-fashioned one in its arrangement, and has been in cultivation for upwards of thirty years. There are about fifty-one hundred square feet, as an outside measure, devoted to the cultivation of plants, exclusive of walks, etc.

In order to be able to locate in a catalogue the position in the garden of fixed plants, such as hardy perennials, it is laid out on the principle of latitude and longitude. The fence posts bordering the garden on one side are numbered, and those on the adjoining side, which lies at a right angle with the first, are lettered. Then with a pencil is noted in the margin of the catalogue that such or such a plant is at B 5 or D 3, etc., as for example — B 13, *Lilium Philadelphicum*, with space for remarks. With this system a plant can be easily sought out and renamed if the label is lost. The catalogue is written in pencil so that if a plant is moved the record can easily be changed.

All the hardy perennials and many other plants are labelled with zinc tallies, attached to galvanized iron rods eighteen inches long by a copper or galvanized-iron wire. The names are written with chemical ink on bright zinc (zinc is best made bright by rubbing it with a cloth wet with muriatic acid), or with a soft pencil on oxidized zinc.

The advantages of this means of marking are, durability, immovability, inconspicuousness, and cheapness. The zinc labels can be bought cheap, or made from bits of old or new metal. The rods are used to secure wire netting around croquet grounds, and can be purchased for a dollar and a half per hundred.

This kind of label is particularly convenient for gladioli and similar bulbs, as when taken up in autumn the labels are untwisted from the rods (copper wire should be used here for attaching them), and put in cloth or paper bags with the bulbs.

The garden soil is a deep, rich, natural loam, and is enriched by manure, or has leaf-mould or peat added to it according to the requirements of the plant.

Most Alpine plants and many of the rarest ferns are grown in pots, which are kept in a pit in winter, and in summer are sunk in sand or ashes in partial shade.

The garden contains only plants worth growing from a horticultural point of view, hardy ferns being the only plants with which any attempt at a botanical collection has been made.

There are six hundred and sixty-eight catalogued species and varieties of plants. Besides the catalogued plants there are many others of which written account is not kept, such as annuals, pansies, daisies, seedling primroses, perennials still in the seed beds, etc.

A comparatively brief summary of the collection is as follows: —

Twenty-eight varieties of Geraniums, Agaves, etc., which are wintered in a cellar.

Twenty varieties of Chrysanthemums.

Sixty-six varieties of Gladioli, mostly imported, besides unnamed seedlings.

Nine kinds of tender summer bulbs, such as Vallotas, Tigridias, Ismenes, etc.

Nineteen varieties of Dahlias, mostly remarkably fine seedlings, raised by Mr. John Richardson of Dorchester.

Ten species of Hollies, Yews, *Melianthus major*, etc.

Eight distinct varieties of Mr. John Richardson's very beautiful seedling Pæonies.

Fifty varieties of Hybrid, Perpetual and Tea roses. The latter are kept in a pit in winter, and flowered in the open ground in summer.

The rest of the collection is composed of hardy herbaceous plants and bulbs, Alpine plants (many of which are perfectly hardy, as proven, and probably most will be), shrubs, etc.

The names of the rarer and more interesting plants are given in a list below, together with a complete list of the ferns, which form one of the best parts of the collection: —

Acantholinum glumaceum.

Adonis vernalis.

Aquilegia atrata. — An Alpine species.

" *chrysantha.*

" *glandulosa.* — Perhaps the finest species of the genus.

Arctostaphylos Uva-ursi.

Auricula. — A fine blue and white variety has proved perfectly hardy for more than six years.

Calluna vulgaris. — The type and several varieties are all hardy.

Campanula cæspitosa. — This beautiful species, which grows on the higher Alps of Switzerland, where it was collected in August, 1883, will doubtless prove a great acquisition to gardens. It grows only five inches high, is a great and continuous bloomer, and will probably be perfectly hardy. A First Class Certificate of Merit was awarded for it by the Society on the 2d of August, 1884.

Campanula grandiflora. — First rate.

" " *alba.*

" *isophylla.*

" *muralis.* — A beautiful species.

Campanula persicæfolia.

" *Portenschlagiana.*

" *rotundifolia.*

" " *alba.*— Rare. Collected in the State of New York.

Campanula turbinata.

Cassia Marilandica.

Clematis alpina.

" Five named varieties, among which Mad. Van Houtte is especially noteworthy. It is large, fine, pure white.

Colchicum alpinum,
" *autumnale,*
" *Byzantium,*
" *variegatum,*
} All very satisfactory plants to cultivate.

Cornus florida.

Crocus vernus. — The true Alpine form.

" " Garden varieties.

Cypripedium Calceolus.

" *pubescens.*

Cytisus scoparius.— Not quite hardy.

Deutzia Sieboldii crenata flore pleno.— A perfectly double *pure* white seedling of great merit, raised by Mr. John Richardson.

Dianthus cæsius,
" *glaucus,*
" *versicolor,*
" *viscidus,*
} All Alpine species.
" garden hybrids.

Digitalis purpurea, and the variety *alba.*

Dioscorea batatas.

Dodecatheon Meadia.

Epigæa repens.— I have had this growing for three years in the open ground, and it is doing finely. It flowered this spring and has new shoots five inches long. It was collected in the woods.

Erica scoparia.

" *tetralix.*

Erythræa diffusa. — A very beautiful dwarf European plant.

Equisetum hyemale.

Eupatorium ageratoides. — Good for cutting.

Fritillaria meleagris, and varieties.

Gentiana acaulis. — Grows and blooms finely in pot culture.

" *Andrewsii.* — A native species, which succeeds admirably; first rate for general cultivation.

Gentiana asclepiadea. — An Alpine species, which also does finely in cultivation. Three plants have now (August 2) an aggregate of two hundred and sixty-six buds on them just ready to open. The plants were collected in Switzerland in 1880. They are perfectly hardy, as proved by the experience of the last two winters in the open ground, and if they can be introduced into general cultivation will prove a very valuable acquisition to our gardens.

Gentiana cruciata.

" *lutea.* — The medicinal gentian.

" *verna.* — A most beautiful species. The last two species are not in good condition and very likely will not succeed here.

Gnaphalium Leontopodium. — The Edelweiss of the Swiss. A small plant raised from seed. Its success is not yet assured, though it is now in good condition.

Helleborus niger. — The Christmas Rose, succeeds admirably, generally blooming freely.

Hepatica acutiloba,
" *triloba,*
" " var. *alba,*
} All grow and bloom finely in cultivation.

Hesperis matronalis flore pleno, — A fine, rare, old garden plant. It bears freely, fine pyramidal clusters of white, and highly fragrant flowers.

Hyacinthus candicans. — Proved perfectly hardy in the last three winters.

Hypericum prolificum.

Iberis sempervirens. — A choice seedling, considerably better than those generally grown.

Iris Anglica. Two varieties. — This fine species, in its numerous varieties of rich golden-brown, blue, purple, etc., as grown in England, can hardly be overpraised.

Iris cristata. — A charming species.

" *fulva.*

" *Florentina.*

" *Germanica*, varieties.

" *Kœmpferi.*

" *Pseud-acorus.*

" *setosa.*

" *Sibirica.*

" *Virginiana*, and others.

Kalmia latifolia.

Leucojum vernum.
Lilium callosum.
" *Canadense.*
" " var. *rubrum.*
" *chalcedonicum.*
" *elegans.*
" " var. *cruentum.* — A very beautiful and distinct variety. It grows only eighteen inches high, and bears a large, deep blood-red flower. It received a First Class Certificate of Merit from the Royal Horticultural Society, July, 1882.

Lilium cordifolium var. *giganteum.* — A superb, tall-growing lily, from the Himalayas.

Lilium Harrisii.
" *lancifolium rubrum* and *album.* — One hundred plants.
" *longiflorum.*
" *martagon* var. *album.* — A rare variety.
" " " *Dalmaticum.* — A rare, deep blood-red, or almost blackish variety.

Lilium Philadelphicum. — These have been three years in cultivation, and have borne superb flowers, in heads of one to four flowers, this summer. Some peat is mixed with the soil, and they are grown in full sunlight, for the most part. Fifty plants.

Lilium pomponium.
" *pulchellum.*
" *superbum.*
" *tenuifolium.* — Beautiful.
" *testaceum.*

Liparis liliifolia. — A rare native orchid.
Lobelia cardinalis. — Fine in cultivation.
Lychnis Chalcedonica flore pleno.
" *Haageana.*
Magnolia Soulangeana. — A great bloomer.
Menziesia polifolia.
Mertensia Virginica. — A fine, rare, old plant.
Mitchella repens. — Very pretty for rock-work.
Muscari botryoides.
" *racemosum.*
Narcissus bicolor var. *Horsfieldi*, } All are superb.
" " " Emperor, }
" " " Empress, }

Narcissus Bulbocodium, and many other species and varieties.

Nertera depressa. — A choice little plant from the Andes. It bears scarlet berries on moss-like tufts of leaves, and grows well with pit culture in winter and plunging the pots in sand in summer.

Œnothera fruticosa.

Opuntia vulgaris.

" *Missouriensis.*

Orchis. — Several fine species from Central Europe, which succeed perfectly in cultivation. Thirty plants. Also several species of European, British, and native orchids.

Parnassia palustris.

Phlox amœna. — A fine species.

Phloxes. — Many fine seedlings of Mr. John Richardson's, and named varieties.

Primroses. — The Polyanthuses, and some of the more vigorous species, are planted out in the open ground in summer, and mostly lifted and potted for a pit, or put in a cold-frame for the winter. The more delicate and rarer species are kept in pots continuously, and, being wintered in a pit, are sunk in sand or ashes in summer, in a partially shady place. For the Polyanthuses, etc., a moderate share of sun in summer is best, as, if too shady, the plants are not as strong as with more sun; they should have abundant water however. They are all a class of plants which should be more widely cultivated, as most of them are very easy to manage, and when in bloom they are exceedingly attractive.

Polyanthuses. — Many seedlings. Several plants left out during the past winter proved perfectly hardy, and flowered finely in the spring.

Primula acaulis lutea flore pleno.

" " *platypetala flore pleno.*

" " *purpurea flore pleno.*

" " *rubra flore pleno.* — All the above double varieties are beautiful in color and form.

Primula auricula. — The type species from which the auriculas come. Native of the Alps, etc.

Primula capitata, } Both very beautiful.
" *Cashmeriana,* }

" *Clusiana.* — Native of the Alps.

" *cortusoides.* — A fine species, a native of Siberia, and generally hardy; but an extra hard winter will kill it.

Primula denticulata. — A fine species, native of the Himalayas.

Primula elatior. — Native of England and other parts of Europe.

" *farinosa.* — A pretty, small species, native of all Europe and this country.

Primula Japonica.

" *Mistassinica.* — A dwarf species, native of this country.

" *purpurea.* — A superb, strong growing species, with fine head of lilac flowers. One of the most desirable. A native of the Himalayas.

Primula rosea. — A fine species, native of the Himalayas.

" *spectabile.* — An Alpine species.

" *verticillata.* — A fine species, with bright yellow flowers.

" *viscosa.* — An *exquisite* species; native of the Alps.

" " *nivalis.* — Also very beautiful and very rare. It is a white variety of the preceding.

Polygonatum giganteum. — Fine for effective foliage.

Ramondia Pyrenaica.

Retinosporas, and other dwarf evergreens. Several species and varieties.

Rhododendron ferrugineum. — The Alpine Rose.

Rosa multiflora.

" *rugosa*, and several other species.

Rose. — Dwarf Scotch; double white. A first rate plant.

Sanguinaria Canadensis. — Fine in cultivation.

Saxifraga palmata.

" *Maderensis.*

" *bryoides*, and other species.

Scilla nonscripta and varieties. — First rate.

Silene maritima. — A beautiful little plant.

Spiræa Filipendula var. *flore pleno.*

" *palmata*, and others.

Stellaria holostea. — A first-rate plant.

Taxus baccata var. *Canadensis.* — A fine, low, shrubby, native evergreen, which should be more generally grown.

Taxus baccata var. *fastigiata.*

Thalictrum anemonoides. A most charming plant in cultivation.

Trillium erectum.

" *erythrocarpum.* — Beautiful.

" *grandiflorum.* — Should be in *every* garden.

" *sessile.* — All these Trilliums do well in cultivation.

Veronica amethystina.

Viola cucullata.

Viola cucullata, var. *alba*.
" " var. *variegata*.
" *lanceolata*.
" *pedata*. — Grows and flowers well.
" " var. *bicolor*.
" *rotundifolia*.
" *saggitata*. The above species of violets, although not all rare, well repay cultivation.

The ferns form one of the principal features of the garden, being scattered singly or in clumps in every available shady spot. Many of them have been in their present position for from six to ten or more years, and have formed fine specimen plants, producing as good fronds as those usually found in the wild state, and often better.

Most species of ferns are of the easiest possible culture, requiring only moderate shade and moisture; although some of the finest clumps in the garden are exposed to nearly full sunlight. Many of the choicer kinds need leaf-mould and peat added to the soil, and in fact these are beneficial to all species.

Broken limestone and other rocks come into good service, both for the benefit to the plants and for the pleasing effect produced by them. Most of the plants in the following list of cultivated species are perfectly hardy, and are grown in the open ground without other protection than that which ordinary hardy plants receive. Choice dwarf kinds, however, as is shown by experience, do better when kept in pots, and wintered in a pit; others, because their hardiness is questioned, or for some other reason, receive the benefit of a cold-frame in winter, which is set over the bed in which they are growing. Where the protection of a frame or pots is used it is indicated in the list; an interrogation mark being added if it is likely to prove unnecessary. All the species, with one exception, are natives of the Northern United States, or of Great Britain and Northern Europe. As descriptions and figures of them can be easily found, none are inserted here.

Adiantum pedatum.
Allosorus crispus; pot.
Aspidium acrostichoides.
" " var. *incisum*.
" *aculeatum;* protection?

Aspidium angulare,
" " var. *lineare*,
" " " *proliferum*,
" " " *polydactylum*; } protection?
" *Bootii*.
" *cristatum*.
" *Filix-mas*, and two varieties.
" *Goldianum*.
" *Lonchitis*; protection?
" *marginale*.
" *Noveboracense*.
" *rigidum*; protection?
" *spinulosum*.
" " var. *dilatatum*.
" *Thelypteris*.
" *munitum*.
" *Nevadense*; protection?
Asplenium adiantum-nigrum; protection.
" *angustifolium*.
" *ebeneum*.
" *Filix-fœmina*.
" " var. *Fieldii*; protection?
" " " *plumosum*.
" " " *Rylsyae*.
" " three other varieties.
" *fontanum*; pot.
" *Ruta-muraria*; pot.
" " var.; pot.
" *Niponicum*, native of Japan.
" *septentrionale*; pot.
" *Trichomanes*; pot.
" *thelypteroides*.
" *viride*; pot.
Botrychium ternatum var. *dissectum*.
" *Virginianum*.
Camptosorus rhizophyllus; pot.
Ceterach officinarum; pot.
Cystopteris bulbifera.
" *fragilis*.
" *montana*; protection?
Dicksonia pilosiuscula.

Lomaria alpina; pot.
" *crenulata;* pot.
" *spicant;* protection?
Lygodium palmatum.
Onoclea sensibilis.
" *Struthiopteris.*
Osmunda cinnamomea.
" *Claytoniana.*
Osmunda regalis.
Pellæa atropurpurea, pot.
" *gracilis*, pot.
Phegopteris calcarea; protection?
" *Dryopteris.*
" *hexagonoptera.*
" *polypodioides.*
Polypodium vulgare.
Pteris aquilina.
Scolopendrium vulgare, } protection.
" " var. *Kelwayi*, }
" " " *marginatum*, }
" " " *scopulatum;* }
and others.
Woodsia Ilvensis.
" *obtusa.*
Woodwardia Virginica.

Grounds of J. W. Manning.

Our next visit was to Reading, for the purpose of inspecting J. W. Manning's collection of Hardy Herbaceous and Perennial plants. We were met by Mr. Warren H. Manning, who conducted us through the grounds, and informed us that in their collection were some five hundred species of hardy plants, including many that grew in old-fashioned gardens years ago and have proved their value by long years of cultivation. They have also a good variety of native plants, which have been sent them from Oregon, California, Dakota, and States nearer home. Among them were some valuable garden flowers, while many proved of little value. Phloxes, Pyrethrums, German Iris, and Pæonies formed prominent features of the collection. We also noticed a Variegated Leaved *Hibiscus militaris*, which will be of value if the variegation is retained.

The flowers are pretty, and it is a good grower. A purple-flowered *Thalictrum Cornuti* was noticed. It is a native seedling, with very pretty clusters of flowers, having purple anthers, and when growing among tall plants it has a peculiar misty appearance. An interesting feature of the collection was some twenty-five named species of Sempervivums and about as many more unnamed species, which are all valuable for rock-work, as they will grow with little or no soil, in the smallest crevices, where their roots will penetrate, and form very interesting tufts and rosettes of plants.

The Sedums, such as *Sieboldii*, and its variegated variety, *speciosum*, *pulchellum*, *acre*, and *monstrosum* may also be mentioned as eligible for similar positions. All these are pretty, both in habit and foliage; and there are many other species, both creeping and upright, equally well adapted for rock-work as those named. *Erysimum pulchellum* is also a beautiful little rock plant, with mats and tufts of dark green foliage and bright yellow flowers in spring. *Festuca glauca* and *Aira variegata* are dwarf and very ornamental grasses for rock-work, and for a dwarf evergreen shrub *Daphne Cneorum* cannot be excelled.

We have mentioned a few plants that most attracted our attention. Mr. Manning has a large collection and plenty of room to grow them. The cultivation of hardy herbaceous plants has grown upon him beyond his expectation, and as it is his intention to entirely rearrange his garden, we shall be pleased at some future time to notice more fully the result of his skill and perseverance with a class of plants that are fast increasing in popularity for permanent ornamental and decorative purposes.

Pine Grove Cemetery, Lynn.[1]

One delightful day in August, by the invitation of our worthy Chairman, who is Superintendent of the Cemetery, a visit was made to this beautiful place. As we stepped from the cars, in that great city of shoes and strikes, we were met by our genial host who, with his usual thoughtfulness, had provided carriages, which soon brought us to the entrance of the quiet, peaceful city of the dead, where we were met by the President and Board of Commissioners who have control of its affairs. After an introduction to them, and a cordial welcome from them, we were again invited to

[1] The account of the visit to Pine Grove Cemetery is by Henry Rose, of the Committee.

take the carriages for a visit of inspection through the grounds; but a large portion of the Committee preferred to walk. The first point of attraction was the bedding display, a short distance from the gate, inside the grounds. The central design was in the form of a cross, and it was the unanimous opinion of the Committee that the exquisite skill displayed in the arrangement and care surpassed any that they had ever seen elsewhere. As we passed on, leaving the greenhouses on our left, and wending our way up the hill, we were again brought to a stop to look down upon the ornamental garden on our right, and below us the planting-out of shrubs, perennials, and herbaceous plants around the basement of the superintendent's house; the large, circular, sub-tropical beds; the clumps of *Eulalia Japonica var.*, and the rockery, planted with rhododendrons, kalmias, and other flowering shrubs. Beautiful specimen evergreen and deciduous trees scattered here and there showed that the master hand of the landscape artist had been at work. We passed on through winding avenues and paths, stopping to look at the elegant display of tropical plants arranged around the entrance to the receiving tomb. But what was most noticeable was the good taste displayed in planting out of large numbers of hardy shrubs and perennials, beds of which were to be seen in every direction, and more particularly around the new Soldiers' Lot. It is very gratifying to see the change in the taste of the community in favor of planting more hardy shrubs and herbaceous plants and less of ribbon and carpet bedding. Both are beautiful in their place, but we feel that ornamental foliage planting has usurped too large a share of attention. We are also glad to see that another great improvement in laying out, grading, and planting of the grounds is being introduced here, and that is what is called the landscape, lawn, or natural plan; which does away in a great measure with straight avenues and paths, and stiff and formal terraces, substituting gentle slopes and curving, winding avenues and paths, in fact, leaving the landscape more as nature made it. But we are still moving upward, when suddenly there bursts upon our sight one of the most beautiful of panoramic views, standing, as we now do, upon the top of Mount Dearborn, with the busy city of Lynn beneath us, the broad ocean stretching away to the east and south, and dotted over with a great variety of vessels, from the graceful yacht to the great ocean steamer; to the south-west, in the far distance, the city of Boston, and for a background, the rocky range of hills which extends along the north-

ern shore of Massachusetts Bay. In some respects Nature has been very lavish in the bestowment of her favors in this place, especially in the immense supply of rocks that are scattered over the land. The Committee would especially commend, in the management of the grounds, the successful removal of these surplus rocks, the correct landscape principle which has been displayed in laying out and grading the newer part of the grounds, the artistic skill in blending of colors in the flower planting, and the exceedingly good judgment in the selection and planting of trees and shrubs. The great neatness and cleanliness of all the avenues and lots give to the whole a most pleasing and satisfactory effect. There are no piles of rubbish left scattered about on the avenues and lots, no flower beds left weedy and unkept, no dead trees and shrubs left standing. We speak more especially of this because that in many places which have been tastefully laid out, and where large sums of money have been spent, the pleasing effects have been almost lost, from a lack of neatness and care.

After leaving Mount Dearborn your Committee were led through beautiful winding paths and avenues, past the greenhouses, which of course at this time of the year were nearly empty, back to the house, where the wants of the inner man were most amply supplied, and after a very pleasant interchange of views and social converse, we again took the cars to return, feeling it to have been not only a pleasant but a profitable visit.

Vineyard of John B. Moore & Son.

On the 11th of September we visited the grounds of John B. Moore & Son, for the especial purpose of inspecting one acre of his vineyard, and as a written statement has been prepared to accompany this report, we shall, after asking your careful perusal of it, say no more, except that the expectations of your Committee were more than realized in this visit. Although going for a special purpose, we feel that it is only justice to the Messrs. Moore to say that all through their grounds the high standard of cultivation for which they are so well known is fully maintained. Neatness and order are the rule and not the exception. All the crops showed that they were well cared for; and this was especially noticeable on the roses, which had made a splendid growth of well-ripened wood. The influence of a cultivator who has set for his standard nothing

short of the best cannot but have an influence for good, in arousing others to attain to that which, by patience, hard work, and perseverance, he has gained. We certainly have in our President a thorough, practical horticulturist, and there is no doubt that we shall in the future enjoy the benefit of his practical labors, as we have done in the past.

The following is the statement of Messrs. Moore:—

JOHN G. BARKER, *Chairman of the Committee on Gardens, Massachusetts Horticultural Society:* —

DEAR SIR, — In accordance with your request, we submit for the consideration of your Committee the following statement in regard to one acre of our vineyard, planted with Moore's Early grape vines, which you examined last September.

We selected that part of our vineyard on which our oldest vines were planted, now ten or twelve years ago, and also the next adjoining sixteen rows, which were planted four and five years later. This selection was made, not for the purpose of a more favorable showing to your Committee, as you may well know from viewing the entire vineyard, but to show the condition of vines subjected to different methods of pruning for a number of years.

The lot of land upon which these vines are grown is nearly level, and located on the top of a range of hills extending in a direction nearly east and west from the centre of Concord towards Lexington, one and one-half miles, and is about seventy-five feet above the level of the brook in the valley south of the hill.

The soil is a rather thin, gravelly loam, and in some parts of the piece full of small cobble-stones; the subsoil is a red, gravelly material, and this is underlaid with a hard gravel, full of stones as large as are commonly used for paving streets and gutters.

This land had been used for various crops previous to its being planted to grape vines, and did not receive any special preparation for vineyard purposes, and since the planting of the vines no stable or other manure has been applied to it, except an annual dressing, early in the spring of the year, of five hundred pounds of crude undissolved ground bone and two hundred pounds of high-grade (eighty-three per cent) muriate of potash, or its equivalent in unleached wood ashes, per acre. This amount of dressing has always produced a fair crop of fruit and a reasonable growth of well-ripened wood.

All the vines were planted early in the spring of the year, but not from any preference for that season, as we consider the fall just as favorable a time to plant.

The oldest vines are trained on large stakes, and planted in rows running north and south, nine feet between the rows and eight feet apart in the rows. We think that they might have been planted seven feet apart in the rows without any detriment.

The other sixteen rows are trained to a wire trellis, the rows being the same distance apart as those on the stakes, with the vines seven feet from each other, and we think six feet in the row would have been fully as favorable a distance as seven.

The distance of nine feet between the rows was arranged as a matter of convenience for the passage of wagons or carts.

The cultivation has been done by plowing about four inches deep, early in the spring, between the rows, turning the furrows towards the vines, and afterwards by stirring between the rows with a common steel-tooth cultivator often enough to keep down all weeds between the rows, and also by hoeing out between the vines a few times during the season.

This frequent stirring of the soil we find very beneficial, and it has a similar effect upon this, which would be called rather dry land, to that of mulching; that is, it prevents evaporation, at the same time avoiding the sometimes injurious effects of mulching, which often encourages the growth of new roots so near to the surface of the land as to allow the sudden changes in the weather to materially injure the plants; it also leaves the soil in that loose and friable condition which enables it to absorb the rain from a sudden shower, for the benefit of the crop, instead of allowing the water to flow over a hard baked surface to the nearest brook.

A part of these vines have been trained to stakes; two stakes to a vine, in line with the rows of vines, standing eighteen inches on each side of the vine, and set in the ground two and one half feet deep, standing out of the ground six feet. One cane from each vine is trained spirally around each stake and fastened securely at the top, and finally, as the vine grows larger, is spur pruned from top to bottom. With this method the shoots do not require any further tying during the season.

The objections to this method are the greater liability to the breaking of the tender shoots early in the season, and of rubbing off the bloom from the fruit when ripening, by the action of the

wind and violent storms. This, however, is somewhat obviated in a sheltered location.

There is one great advantage in favor of the stakes in the cultivation, and that is, that the horse and cultivator can pass through both ways, which saves some hand work.

In the spur pruning of hardy grape vines the spur itself becomes too long after a few years. This can be remedied by a more careful pruning of the vine.

The rest of the vines — sixteen rows — are trained to a wire trellis, consisting of four wires stretched horizontally from post to post, the bottom wire twenty inches from the ground, the second wire fourteen inches above the first one, the third wire twelve inches above the second, and the top wire fourteen inches above the third, which makes the top wire just five feet from the ground. This method of training is a modification of that practised by Dr. Fisher, of Fitchburg, and known by his name.

These vines are fruited from new arms grown the previous year, and are trained as follows: the arms or canes on every other vine are tied with cotton twine to the lower wire on the trellis, and those on the alternate vines to the third wire. This is all done early in the spring before the vines start, to prevent any breaking out of the buds. In June the new fruiting shoots, having become of sufficient length, are all tied with twine to the wire above the arm from which they grow. This method requires considerable time to tie up the numerous shoots, but when tied it keeps them safely from breaking, and from injury to the looks or bloom of the berries to any great extent, by winds and storms when ripening.

Not having kept any separate account of the product of this part of the vineyard we are unable to state the number of pounds gathered from it. A few of the old vines had from twenty-five to thirty pounds of well-ripened fruit on each vine. The bunches, particularly on the old vines, were quite large, a few of them weighing over twenty-four ounces each.

We have stated our methods of pruning and cultivation, such as we think adapted to our soil and climate, as fully as the time and space will admit. You have seen the results of those methods.

Very respectfully yours,

JOHN B. MOORE & SON.

Concord, Mass., October 1, 1884.

Awards.

The following awards have been made: —

For the best collection of Hardy Biennial and Perennial Herbaceous plants, to Robert T. Jackson, . .	$20 00
Second prize to J. W. Manning, ...	10 00
For the best vineyard of one acre, to John B. Moore & Son for one acre of Moore's Early Grape, . .	30 00
To Henry Ross, Superintendent of Newton Cemetery, for well kept grounds and improvements in bedding out and permanent ornamentation by introducing new trees, shrubs, and hardy herbaceous plants, a Gratuity of	20 00
To John G. Barker, Superintendent of Pine Grove Cemetery, Lynn, for the energy shown in subduing the extreme natural roughness of the grounds, and the taste and skill displayed in laying out the grounds, and in the ornamental planting of both hardy and tender plants, a Gratuity of	20 00

John G. Barker,
William H. Spooner,
E. W. Wood,
Charles N. Brackett,
Charles W. Ross,
Committee on Gardens.

REPORT

OF THE

COMMITTEE OF ARRANGEMENTS,

FOR THE YEAR 1884.

The Committee of Arrangements, reviewing the exhibitions of the Society during the year now closing, can with natural satisfaction pronounce them the most successful, so far as the quality, beauty, and extent of exhibits are considered, which have taken place for many years at least, and possibly they exceed in these respects any in the history of the Society. The interest of the large private exhibitors, upon whose coöperation the Society so much relies, has increased rather than diminished, and the Committee willingly testify to the great value of this aid, without which it would be difficult to maintain the beauty and brilliancy of their larger exhibitions during the year, which have become famous in all quarters where Horticulture has friends. Neither can the Committee ignore the practical services of the gardeners in charge of these private establishments, whose unflagging interest, often attended with great personal inconvenience and effort, has been one of the strongest factors in the Society's success. It is to be hoped that these services will have some more practical recognition in future exhibitions than has been the case in past years. Private gardeners are, as a rule, debarred from personal competition for prizes; but certainly nothing would conduce more to strengthen the close personal interest of the gardening profession in the future growth and success of the Society than to establish certain prizes to be competed for by gardeners within consistent limitations. Our great strength, however, rests with those who may properly be denominated amateurs, and to this enthusiastic class the Society is under heavy indebtedness; and we may express a hope that the

product of the amateur's skill and labor in all branches of culture may take even more prominent position in future exhibitions than in the past.

The record indicates no such remarkable revival of popular interest in the exhibitions as has taken place in 1884. The paid admissions for this year have been greater than the total for the five years combined previous to 1881 (when the Pomological Society held its annual meeting in Boston), having amounted to $2,815 05. The paid admissions to the Annual Exhibition in 1884 were about equal to the total admissions to all the large exhibitions of the Society in 1883. Much of this increase is due to the extension of time during which the Spring, Rose, and Chrysanthemum Exhibitions were held; but it also indicates that the public are quick to appreciate our efforts, and we may reasonably hope for still further encouragement in 1885.

The Committee would suggest as a means for the increase of paid admissions some limitation of the use of the family tickets issued by the Society, whose liberal privileges accorded to members ought not to be abused. The Committee are cognizant of instances where from seven to twelve persons claimed admission to one exhibition at various times on one member's ticket, and there are many instances where these tickets are loaned to outside persons having no claim upon the Society, and who use them to the great detriment of its interests. This is an injury which warrants a summary suppression.

In connection with the allusion to increased receipts the Committee can state that they have not been accompanied by increased expense, and it is probable that some comparative decrease may be shown. The increase in the number of days on which the Spring, Rose, and Chrysanthemum Exhibitions were held having had so much to do with our favorable report, it is proposed for the ensuing year to keep each of these shows open for two days instead of one. The Spring Show in March, which is of comparatively recent origin, promises to become one of the most prominent of the Society's exhibitions, and provision has been made in the Prize Schedule to insure this result if possible. The exhibitions of fruit and vegetables have been noteworthy, and show the same favorable advance indicated in the floral department. These are more fully covered by the reports of the respective committees.

Some increased facilities for carrying plants to the upper hall are greatly needed, and it is suggested that the present elevator,

worked by hand power, is inadequate to handle the immense number of plants which are taken into the upper hall each year, many of which are of large size and great value. These are greatly damaged by reason of the small size of the elevator. We need an elevator double the size of the present one, and worked by steam, which we believe is feasible, the Society having steam power at its command. Such an elevator would make the upper hall more accessible, and could be fitted during exhibitions to carry many old and infirm people, hundreds of whom are at present debarred from attendance on account of the long flight of stairs. We urge that such alterations be taken under consideration, and, if it can be done without unreasonable expense, that they be carried out, confident that they will result in great material advantage to the Society.

The Committee, in closing, would express the hope that at a time not distant the Society will be able, at least occasionally, to hold some of its larger exhibitions upon the ground floor of a spacious hall or enclosure in the city where easy access for the public and exhibitors can be had, and where the arrangement of plants and flowers can be more naturally and beautifully accomplished than in the narrow limits of the present building of the Society, which, while ordinarily ample for our purposes, is likely to be dwarfed and overrun at times by the increasing bulk of the exhibits.

This has already led to overcrowding in the arrangement and has detracted in a measure from the beauty and effectiveness of displays. With ample accommodation and intelligent action there is no reason why the larger exhibitions of the Society should not become so popular that, for hundreds of visitors, in their place we should have thousands, and the scope and influence of the Society as an educator of the tastes not only of this community but of the whole country should thereby become greatly enlarged.

E. L. BEARD,

Chairman of Committee of Arrangements.

REPORT

OF THE

COMMITTEE ON THE LIBRARY,

FOR THE YEAR 1885.

The Committee on the Library has but little to report as to the trust committed to it. The Library affairs have been, on the whole, as prosperous and progressive as in the average of years past. The income of the Stickney Fund has been duly expended for works on Horticulture and allied subjects, in accordance with the conditions imposed by the generous donor; while the Society's appropriation has paid, as heretofore, for the various periodical publications to which we subscribe and for binding.

The list of purchases, which will be printed in connection with this report, will show a goodly array of books of great value and interest, the most important acquisition of the year being the first ninety-two parts of the "Flora Brasiliensis," now in progress of publication under the patronage of Dom Pedro II., the Emperor of Brazil. This truly magnificent work, which, when complete, is to contain a description of every plant known to inhabit the Empire of Brazil, with excellent plates of many, will be worthy to take rank with the "Flora Danica" and the "Flora Græca" of Dr. Sibthorpe, works which would adorn the grandest libraries of the world, yet which, by Mr. Stickney's liberality, we can count among our treasures.

Remembering that this Society is not a botanical but a horticultural society, we have endeavored to keep watch of notices of new publications, so that nothing bearing upon the practice of gardening and kindred topics should escape our notice. We have bought everything of the kind which has appeared, and shall continue to do so, but the supply is by no means as abundant as we

wish, and of those we buy from year to year by far the larger part suit European conditions, not American. We earnestly request members who desire the purchase of any book to enter the name of it in the blank-book kept for the purpose at the Librarian's desk. Any book so asked for will be bought, and this Committee will be thankful for the suggestion of it.

The progress of the Card Catalogue of Plates has been very gratifying, and all we could expect, though we found ourselves obliged to put the work into other hands early in the year. The number of cards written so far is about thirty-nine thousand; that is, we can now turn with quickness and certainty to thirty-nine thousand figures, which before we could only stumble upon by accident. It will take several years more to complete the work so far that no special writer will have to be employed; but the expense, being spread over so long a period, will not be found a burden.

We are compelled to repeat this year what we have said in almost every report for a long time past. In the report for 1876 we find the following: "The want of room for the Library is seriously felt. . . . It cannot be many years before a reconstruction of the Library-room will be imperatively demanded." These words no doubt have a very familiar sound, yet we are obliged to say that, notwithstanding the additional cases which have been constructed within these eight years, the condition of things is worse today then it was then.

Many of our books are packed in the upper part of the Librarian's room, not to be reached except by the long and inconvenient ladder. Of the shelves lower down, there is hardly one that has not a second row of books behind the visible one. Other books are in the case at the head of the stairs leading to the upper hall, — an unsafe place, as last year's report shows; others in the closet at the head of the southern stairway; and others still (all other available space being crammed and packed) are in the attic of this building, — as much out of the way as if in San Francisco.

There is a remedy for this: a gallery around this room would give us almost double space. Something of this kind should be done, and done soon, unless we are prepared to say that we will buy no more books, but will allow the fund to slip from our hands, thus relinquishing an income of $11,200, which will be ours before our use of the principal must be given up.

The death of our late President, the Hon. Francis B. Hayes, will be especially felt by this Committee. His knowledge of books and

his own choice collection of them gave him, at the very beginning of his presidency of the Society, a hearty appreciation of the value of our Library. All our efforts for the improvement and increase of the collection have had his cordial coöperation, and we are confident that to his active help we owe many conveniences here which we otherwise might have waited years to obtain.

For the Committee,

WILLIAM E. ENDICOTT, *Chairman.*

LIBRARY ACCESSIONS.

Books Purchased.

Hemsley, W. B. Biologia Centrali-Americana. Vol. 3, Part 16, November, 1883, and Part 17, February, 1884, in continuation. 4to. 14 plates. London: 1883, 1884.

Martius, C. F. P. de. Flora Brasiliensis, etc. 92 Fasciculi. Folio. Plates. Leipsic: 1840–1884.

Watson, Hewett Cottrell. Topographical Botany, being Local and Personal Records towards showing the Distribution of British Plants, traced through the 112 counties and vice-counties of England, Wales, and Scotland. 2d edition, corrected and enlarged. 8vo. London: 1883.

Lightfoot, The Rev. William. Flora Scotica. 2 vols. 8vo. 35 plates. London: 1777.

Schlechtendahl, Dr. D. F. L. von, Dr. L. E. Langethal, und Dr. Ernst Schenk. Flora von Deutchsland. Lieferungen 96–127, in continuation. Small 8vo. Colored plates. Gera Untermhaus: 1883–1884.

Karsten, H. Deutsche Flora. Pharmaceutisch-medicinische Botanik. Part 13, completing the work. 8vo. Berlin: 1883.

Seboth und Graf. Die Alpenpflanzen. Heften 47 und 48. 16mo. 11 colored plates. Prague and Leipsic: 1884.

Cesati, V., G. Passerini, and G. Gibelli. Compendio della Flora Italiana. Fasc. 32, in continuation. 8vo. 2 plates. Bologna, Naples, Rome, and Turin: 1883.

Hooker, Sir J. D., C. B., K. S. I., etc. The Flora of British India. Vol. 2, Sabiaceæ to Cornaceæ. Vol. 3, Caprifoliaceæ to Apocynaceæ. 2 vols. 8vo. London: 1879, 1882.

Beddome, Colonel R. H., F. L. S., etc. Handbook to the Ferns of British India, Ceylon, and the Malay Peninsula. Square post 8vo. 300 illustrations. Calcutta, Bombay, and London: 1883.

Gregg, W. H., Lecturer on Botany, etc., Hughli. A Text-Book of Indian Botany, being an Introduction to the Study of Indian Botany. Part 3, completing the work. Small 8vo. Many wood-cuts. Calcutta: 1883.

Wight, Robert, M. D., F. L. S. Spicilegium Neilgherrense; or, A Selection of Neilgherry Plants, drawn and colored from nature, etc. 2 vols. 4to. 202 colored plates. Madras, Calcutta, and London: 1851.

Pierre, L., Directeur du Jardin Botanique de Saïgon. Flore Forestière de la Cochin China. Fasc. 6. Plates 81–96. Paris.

Yokoussai, Iinouma. Sô-Mokou-Zoussets. 20 vols. 8vo. 2d edition. Many plates of Herbaceous plants of Japan. 1874.

Von Mueller, Baron Ferd. Eucalyptographia. Ninth decade, in continuation. 4to. 11 plates. Melbourne: 1883.

Warner and Williams's Select Orchidaceous Plants. Part 8, series 3, in continuation. Folio. 3 colored plates. London: 1884.

Warner, Williams, and Moore's Orchid Album. Vol. 3, parts 30–36; vol. 4, parts 37–42, in continuation. 4to. 52 colored plates. London: 1883, 1884.

Fitzgerald's Australian Orchids. Parts 3–6, in continuation. 40 colored plates. Imperial folio. 1880.

Van Geert, Auguste. Iconography of Indian Azaleas, comprising Figures and Descriptions of the best varieties, old and new. Translated by Thomas Moore, of Chelsea. 4to. 36 colored plates. Ghent: 1882.

Kerchove de Denterghem, Oswald de. Les Palmiers. Histoire Iconographique; Géographie, Paléontologie, Botanique, Description, Culture, Emploi, etc. Large 8vo. 40 colored plates. 238 wood-cuts. Paris: 1878.

Nestel's Illustrirter Rosengarten für Rosenfreunde und Rosengärtner. New series. Edited by M. Lebl. 4to. 24 colored plates. Stuttgart: 1879. (Completes the work.)

Journal des Roses (Rosa inter flores). Publication mensuelle speciale. Fondée par M. S. Cochet, Horticulteur Rosiériste, à Grisy-Suisnes (Seine et Marne). M. Camille Bernardin, Redacteur en chef, à Brie-Comte-Robert (Seine et Marne). 7 vols. Royal 8vo. 84 colored plates. Melun and Paris: 1877–1883.

D'Ombrain, H. Honywood, Editor. The Rosarian's Year-Book for 1884. Square 12mo. Photograph. London: 1884.

Robinson, William, Founder of "The Garden," etc. The English Flower Garden — Style, Position, and Arrangement; followed by a description, alphabetically arranged, of all the plants best suited for its embellishment, their culture, and positions suited for each. With the coöperation of many of the best flower gardeners of the day. Illustrated with many engravings. Royal 8vo. London: 1883.

Wood, John. Hardy Perennials and Old-Fashioned Flowers; describing the most desirable plants for borders, rockeries, and shrubberies, including Foliage as well as Flowering Plants. Small 8vo. 112 wood-cuts. London: 1884.

Fish, D. T. Bulbs and Bulb Culture, being descriptions, both historical and botanical, of the principal bulbs and bulbous plants grown in England, and their chief varieties; with full and practical instructions for their successful cultivation, both in and out-of-doors. Illustrated. 2 vols. 8vo. London: n. d.

Buss, Frederick. A Practical Treatise on the Fuchsia. 8vo. pamphlet. 12 wood-cuts. London: 1883.

Roberts, William. The Lily of the Valley: All about it, and How to Grow it. Forced In-doors and Out-of-doors in Various Ways. 8vo. pamphlet. 5 wood-cuts. London: 1883.

Burbidge, F. W. The Chrysanthemum: its History, Culture, Classification, and Nomenclature. 8vo. Wood-cuts. London: 1884.

Mott, Frederick T. Flora Odorata: a Characteristic Arrangement of the Sweet-Scented Flowers and Shrubs cultivated in the gardens of Great Britain. 16mo. London: 1843.

Williams, Benjamin Samuel, F. L. S., F. R. H. S., etc. Choice Stove and Greenhouse Flowering Plants, comprising descriptions of upwards of thirteen hundred species and varieties. 3d edition, enlarged, illustrated, and revised. Vol. 1. 12mo. Many plates. London: 1883.

Willdenow, D. C., Professor of Natural History and Botany at Berlin. The Principles of Botany and Vegetable Physiology. Translated from the German. A new edition, greatly enlarged by the author. 8vo. Edinburgh: 1811.

Herrick, Sophia Bledsoe. The Wonders of Plant Life under the Microscope. Square 12mo. 85 wood-cuts. New York: 1883.

Masters, Maxwell T., M. D., F. L. S. Vegetable Teratology, an account of the Principal Deviations from the usual constructions of Plants. 8vo. 268 wood-cuts. London: 1869. [Published by the Ray Society.]

Reports on the Progress of Zoölogy and Botany, 1841, 1842. 8vo. London: 1845. [Published by the Ray Society.]

Ray, John, Memorials of; edited by Edwin Lankester, M. D., F. R. S., F. L. S., Secretary to the Ray Society. 8vo. Plates. London: 1846. [Published by the Ray Society.]

Ray, John, Correspondence of; edited by E. Lankester, M. D., etc., etc. 8vo. Portrait and plate. London: 1848. [Published by the Ray Society.]

Endlicher, Stephanus. Genera Plantarum secundum Ordines Naturales disposita. With 5 supplements. 2 vols. Royal 8vo. Vindobonæ: 1836–1840.

White, William N., of Athens, Ga. Gardening for the South; or, the Kitchen and Fruit Garden; with the best methods for their Cultivation; together with hints upon Landscape and Flower Gardening, etc. 12mo. New York: 1857.

Ravenscroft, B. C. Town Gardening. A Handbook of Trees, Shrubs, and Plants suitable for Town Culture in the Out-Door Garden, Window Garden, and Greenhouse. 12mo. London: 1883.

Passæus, Crispinus. Hortus Floridus, in quo rariorum & minus vulgarium florum icones ad vivam veramque formam accuratissime delineatæ et secundum quatuor anni tempora divisæ exhibentur; incredibili labore ac diligentia Crisp: Passæi junioris delineatæ ac suum in ordinem redactæ. A°: 1614. Extant Arnhemii.

Knight, Thomas Andrew, Esq., F. R. S. and L. S., and President of the Horticultural Society of London. Pomona Herefordiensis: containing colored engravings of the Old Cider and Perry Fruits of Herefordshire, with such New Fruits as have been found to possess superior excellence. Accompanied with a descriptive account of each variety. 4to. 30 colored plates. London: 1811.

London, Horticultural Society. Catalogue of Fruits Cultivated in the Garden at Chiswick. 8vo. London: 1826. Also, the second edition. 8vo. London: 1831.

Lindley, George, C. M. H. S. Guide to the Orchard and Fruit Garden, etc. New edition, by Michael Floy, C. M. H. S. With additions of American Fruits. 12mo. New York: 1846.

Fish, D. T. The Hardy Fruit Book; consisting of a series of exhaustive treatises on the various hardy fruits grown in England; giving the history, the most desirable sorts, and the best methods of cultivation of each. Vol. I. The Apple, Pear, Peach, and Nectarine. Vol. II. The Apricot, Plum, Cherry, Medlar, Fig, Mulberry, Quince, Walnut, Chestnut, Filbert, Gooseberry, Currant, Raspberry, and Strawberry. 2 vols. in 1. Post 8vo. Many wood-cuts. London: n. d.

Mott, F. T., F. R. G. S. The Fruits of all Countries. A preliminary Catalogue. Oblong 8vo. pamphlet. Leicester, Eng.: 1883.

Lelieur, M. le Comte de, Ville-sur-Arce, etc. La Pomone Française, ou Traité des Arbres Fruitiers, etc. 2e édition. 8vo. 15 plates. Paris: 1842.

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Journal Officiel de la République Française, Paris, October 1, 1884. 4to. [Contains an article on the Destruction of the Winter Egg of the Phylloxera.] Charles Joly.

Ontario Agricultural College and Experimental Farm. Annual Reports for the years 1879, 1881, 1882, and 1883. 4 pamphlets. 8vo. Toronto, 1880–1884. James Mills, President.

Massachusetts Agricultural College. Twentieth Annual Report, January, 1883. 8vo. pamphlet. Boston, 1883. George Noyes.

Massachusetts Institute of Technology. Nineteenth Annual Catalogue of the officers; with a statement of the courses of Instruction, and a list of the Alumni and of the Members of the Society of Arts, 1883–1884. 2 copies. President's Report, December 12, 1883. 2 pamphlets. 8vo. Boston, 1884. The Institute.

Illinois Industrial University, Urbana, Champaign County. Catalogue and Circular, 1883–84. 12mo. Champaign, 1884.

Kansas State Agricultural College. Report of the Professor of Agriculture. Experiments, 1883. 8vo. pamphlet. Plan. Manhattan, 1884. 2 copies.

Smithsonian Institution. Annual Reports of the Board of Regents, showing the Operations, Expenditures, and Condition of the Institution for the years 1873, 1875, and 1882. 3 vols. 8vo. Wood-cuts. Washington, 1874, 1876, and 1884. The Institution.

Boston Society of Natural History. Proceedings, Vol. 21, Part 4; Vol. 22, Parts 1, 2, and 3. 4 pamphlets. 8vo. 3 plates. Boston, 1883, 1884. The Society.

St. Louis Academy of Science. Transactions, Vol. 4. No. 3. 8vo. pamphlet. Plates. St. Louis, 1884. The Academy.

Ottawa Field Naturalist's Club. Transactions, Vol. 1, No. 4; Vol. 2, No. 1. 2 pamphlets. 8vo. Plate. Ottawa, 1883, 1884. Henry M. Ami and W. L. Scott, Librarians.

Indiana Department of Geology and Natural History. Thirteenth Annual Report, by John Collett, State Geologist. 8vo. Map, and 39 plates. Indianapolis, 1884. D. E. Hoffmann.

Leopoldina, etc. Heften 18 und 19, 1882 and 1883. 2 pamphlets. 4to. Halle, 1882 and 1883. Dr. C. H. Knoblauch, President.

Morren, Édouard. Correspondence Botanique. Liste des Jardins, des Chaires, des Musées, des Revues, et des Sociétés de Botanique du Monde. Dixième édition. Liége: 1884. 8vo. pamphlet. The Author.

Joly, Charles. Note sur les Halles Centrales. 8vo. pamphlet. [Extrait du Journal de la Société Nationale d'Horticulture de France, 3e série t. 6, 1884, pp. 232–239]. The Author.

Goodwin, Daniel, Jr. The Dearborns (Henry and Henry A. S.) A Discourse commemorative of the Eightieth Anniversary of the occupation of Fort Dearborn, and the First Settlement at Chicago. Read before the Chicago Historical Society, Tuesday, December 18, 1883. 8vo. pamphlet. Portraits. Chicago, 1884. The Author.

Signal Service Notes, prepared under the direction of Brig. and Bvt. Maj. Gen'l W. B. Hazen, Chief Signal Officer of the Army. Nos. 5–12, 15 and 16. 9 pamphlets, 8vo, and 1 bound volume. Washington: 1883, 1884. The Chief Signal Officer.

Professional Papers of the Signal Service; prepared under the direction of Brig. and Bvt. Maj. Gen'l W. B. Hazen, Chief Signal Officer of the Army; No. 7, Report on the Character of Six Hundred Tornadoes, by John P. Finley, Sergeant Signal Corps, U. S. A.; No. 10, Tables of Rainfall and Temperature compared with Crop Production, by H.

H. C. Dunwoody, 1st Lieutenant, 4th Artillery, Acting Signal Officer. 2 pamphlets. 4to. Washington, 1882 (No. 10), 1884 (No. 7). The Chief Signal Officer.

Penhallow, Professor D. P. Houghton Farm. Experiment Department. Agricultural Physics. 1883. Meteorology and Soil Temperatures. Series 1, Nos. 3 and 4. Imp. 8vo. pamphlet. Plate and charts. New York. The Author.

Lynn Public Library. Twenty-First Annual Report of the Trustees, for the year ending December 31, 1883. 8vo. pamphlet. Lynn: 1884. Edward S. Davis.

Astor Library. Thirty-fifth Annual Report of the Trustees, for the year 1883. 8vo. pamphlet. New York: 1884. F. Saunders, Librarian.

Library Company of Philadelphia. Bulletins, July, 1884, and January, 1885. 2 pamphlets. 8vo. Lloyd P. Smith, Librarian.

University of Minnesota. Calendar for the year 1883–84. 8vo. pamphlet. Minneapolis: 1884.

Cornell University Register, 1883–84. 12mo. pamphlet. Ithaca, N. Y.

United States Bureau of Education. Report of the Commissioner for the year 1882. 8vo. Washington: 1884. Circulars of Information, No. 5, 1873; Nos. 1–5, 1884, etc. 8 pamphlets. 8vo. Washington: 1873, 1884. Hon. John Eaton, Commissioner.

Tropical Products Company of Boston. Report of the President to the Stockholders. 8vo. pamphlet. Boston: 1884. William T. Brigham, President.

United States Consular Reports. On the Commerce, Manufactures, etc., of the Consular Districts. Nos. 3, 6, 7, 11–13, 15, 17, 21, 22, 24–26½, 30–45, and Index to Reports 1–26½. 32 pamphlets. 8vo. Washington: 1881–1884. Published by the Department of State, according to Act of Congress. Hon. Frederick T. Frelinghuysen, Secretary of State.

Commercial Relations of the United States with Foreign Countries, 1880–1883. 3 vols. 8vo. Washington: 1882–1884. Declared Exports for the United States, 1883. 2 pamphlets. 8vo. Washington: 1883, 1884. Hon. Frederick T. Frelinghuysen, Secretary of State.

Periodicals Purchased.

English. — Gardeners' Chronicle.
Gardeners' Magazine.
Journal of Horticulture and Cottage Gardener.
The Garden.
Gardening Illustrated.
Curtis's Botanical Magazine.
Florist and Pomologist.
Journal of Botany.
Journal of Forestry.
Woods and Forests.

FRENCH. — Revue Horticole.
Revue des Eaux et Forêts.
Journal des Roses.
BELGIAN. — Illustration Horticole.
Belgique Horticole.
Revue de l'Horticulture, Belge et Étrangère.
GERMAN. — Botanische Zeitung.
Gartenflora.
AMERICAN.—Country Gentleman.
American Naturalist.

PERIODICALS RECEIVED IN EXCHANGE.

Gardener's Monthly.
Canadian Horticulturist.
Ladies' Floral Cabinet.
Rural Californian.
American Garden.
Vick's Illustrated Monthly Magazine.
Green's Fruit Grower.
Seed Time and Harvest.
Botanical Gazette.
Maine Farmer.
The Home Farm.
Mirror and Farmer.
New England Farmer.
Massachusetts Ploughman.
American Cultivator.
New England Homestead.
Our Country Home.
American Agriculturist.
Rural New Yorker.
The Husbandman.
American Rural Home.
Fruit Recorder.
Maryland Farmer.
Florida Dispatch.
Prairie Farmer.
The Industrialist.
Boston Daily Advertiser.
Boston Morning Journal.
Boston Post.
Boston Daily Globe.
Boston Evening Transcript.
Daily Evening Traveller.
The Cottage Hearth.

REPORT

OF THE

SECRETARY AND LIBRARIAN,

FOR THE YEAR 1884.

The duties of the Secretary and Librarian are so varied that it is extremely difficult, in the report which is expected annually, to convey any just idea of what has been accomplished during the year, — indeed this could hardly be done without keeping a journal, which would require too much time. The difficulty of making a report is increased when, as in the present case, it comes after those of the Committee on Publication and Discussion and the Committee on the Library, which have already so fully covered the ground. I may say, as in past years, that the work has continued to increase at every point. The correspondence, which suddenly doubled in amount about four years ago, has since steadily increased, and some days the mails bring in books, magazines, pamphlets, etc., for the Library almost as fast as I can record them and otherwise properly dispose of them. The list of persons and societies to whom copies of the "Transcript" reports of our Discussions are weekly sent is this year larger than it was last year. The number of days devoted to exhibitions has increased in the past year, and has by so much lessened the time applicable to work on the TRANSACTIONS, etc. I do not wish to be understood that a great amount of time has been occupied in any one of the ways just mentioned, but I speak of them as instances of the increase of work in many directions, consuming in the aggregate a great deal of time.

The movement by the two leading horticultural societies of this State to obtain exemption from taxation reminded us of the fact that in many States not only are horticultural societies exempted from taxation but they receive positive aid from the State. This

was so strong an argument for at least relieving the property of the Society from the heavy burden of taxation to which it had been subjected in years past that I took pains to ascertain the extent to which aid had been given elsewhere. This required a careful examination of about a hundred volumes of reports of horticultural societies, at the expense of considerable time, which was thought to be justified by the importance of the end in view. It may be of interest to state as the result of these investigations that eleven States, — Ohio, Indiana, Illinois, Michigan, Iowa, Wisconsin, Minnesota, Kansas, Nebraska, Missouri, and Rhode Island, were found to have received aid from the State, either in the form of appropriations of money from the treasury, or by having their reports printed at the expense of the State, or in both these ways. The largest appropriation of money was in Kansas, which, commencing with a few hundred dollars, was gradually increased to $4,500 in 1882. In Wisconsin 12,000 copies of the Transactions of the State Horticultural Society are printed at the expense of the State, and in Ohio 18,000 copies are printed in connection with the report of the State Board of Agriculture, besides a separate edition for the use of the Horticultural Society.

Specimens of fruit have continued to be presented for name, and many of those not at once recognized are left for study, or to be named by experts, and generally we are successful in ascertaining the names, but a large part of those thus left are never inquired after again, and it is to be regretted that my time and that of others should be taken up in identifying fruits for those who do not feel sufficient interest in them to inquire whether the names have been ascertained.

Every book in the Library is annually taken from the shelf, and the books and shelves are carefully dusted, thus making sure that not more than one year's dust shall accumulate, even on the books most seldom used. Advantage was taken of this cleaning time last summer to make a careful count of all the books and pamphlets in the Library, which has not been done since 1878, when a count was made for the purpose of recording the result in the history of the Society. There were then, in round numbers, 3,400 books and 600 pamphlets. The count of this year (including those added to the present time) shows 4,800 books and 1,350 pamphlets, an increase of 1,400 books and 750 pamphlets since 1878, the number of pamphlets added during the last six years being greater than those accumulated in all the previous fifty years of the Society's

existence. The numbers here given do not include nursery and seed catalogues, of which the greater part has been acquired within the last four years. It will be seen that the increase in books alone in the last six years is more than forty per cent, while the increase in bookcases, which six years ago were crowded, is much less, and consequently the bookcases are now more crowded than ever, and I have been obliged during the past year, for want of any better place, to begin storing books in the attic. Although only such books were placed there as are seldom consulted, this course was entered on with regret. The crowded state of the bookcases and the scattering of the books through the building not only lessens the usefulness of the Library, but adds greatly to the labors of the Librarian when books are added to the Library; or when from any cause he has occasion to examine them, which is frequently the case, as well as when members desire to take them out or to consult them here.

ROBERT MANNING,
Secretary and Librarian.

TREASURER'S REPORT,

FOR THE YEAR 1884.

RECEIPTS.

Cash on hand, as per last report,	$4,142 51
Rent of Halls,	8,883 82
Rent of Stores,	12,825 27
Admissions and Assessments,	1,170 00
Library — Sale of Books,	2 50
Sale of History,	2 50
Sale of Transactions,	6 00
Mount Auburn Cemetery,	3,522 20
Annual Exhibitions,	2,039 50
	$32,594 30

EXPENDITURES.

Labor,	$1,175 87	
Salaries,	2,275 00	
Incidentals,	209 27	
Interest,	2,703 11	
Taxes,	1,700 00	
Repairs on Building,	409 95	
Heating and Water, (less paid by Tenants),	650 44	
Lighting,	1,071 77	
Furniture and Fixtures,	287 80	
Prizes,	3,019 25	
Committee of Arrangements,	302 00	
Garden Committee,	26 60	
New Orleans Exposition,	5 60	
Carried forward,	$13,836,66	

Brought forward	$13,836 66	
Stationery, Postage, and Printing, .	781 17	
Stickney Fund, ...	689 05	
Library, ...	300 64	
Card Catalogue, ...	100 00	
Balance Floating Debt, . . .	3,000 00	
Sinking-Fund, ...	6,900 00	
Expenses connected with the Funeral of the President, ...	191 00	
Cash on hand December 31, 1884, . .	6,795 78	
		$32,594 30

ASSETS.

Real Estate, Furniture, and Exhibition Ware, . .		$256,585 56
Library, last year, ...	$22,646 12	
Added this year, ...	1,000 00	
		23,646 12
Bonds, C. B. & Q. R. R., at par, . .		1,500 00
Eight Bonds Burlington & Missouri R. R.,		6,900 00
Stereotype Plates and Copies of History,		391 50
Cash on hand December 31, 1884, . .		6,795 78
		$295,818 96

LIABILITIES.

Mortgage Debt, bearing interest at 4½ per cent, per annum, due October 1, 1888,	$60,000 00	
Loan, without Interest, payable to Harvard College in 1899, . . .	12,000 00	
		72,000 00
Surplus, ...		$223,818 96

MEMBERS.

Number of Life Members, per last report, .		588	
Added during the year, . . .	15		
Commuted, ...	3		
		18	
			606
Deceased, ...			10
			596

Annual Members, per last report, . .	284		
Added during the year, ...	24		
		308	
Deceased during the year, . . .	5		
Discontinued, ...	7		
Commuted, ...	3		
		15	
			293
			889

INCOME FROM MEMBERSHIP.

15	Life Members, ...	$450 00	
24	Annual Members, ...	240 00	
210	Assessments, ...	420 00	
3	Commutations, ...	60 00	
			$1,170 00

The Finance Committee, having audited the accounts of the undersigned, made and have subscribed to, on a book kept for that purpose, the following report: —

The Massachusetts Horticultural Society
In account with GEORGE W. FOWLE, *Treasurer.*

Credit.

By balance in treasury, December 31, 1883, . .	$4,142 51
" total income, as per receipt book, . . .	28,451 79
	$32,594 30

Contra Debit.

To cash paid out, as per disbursement book, . .	$25,798 52
" balance to new account, ...	6,795 78
	$32,594 30

BOSTON, Feb. 2, 1885.

We have examined the above account and find it correct, and the balance of cash on hand, sixty-seven hundred and ninety-five $\frac{78}{100}$ dollars, as stated.

(Signed) H. H. HUNNEWELL,
FREDERICK L. AMES,
JOHN B. MOORE,
Finance Committee.

The income of the Society for 1884 shows an increase over the previous year of $4,500; the balance of the floating debt of $3,000 has been paid; the sum of $6,900 of the surplus funds has been invested in railroad bonds, as a sinking-fund for the reduction of the mortgage debt.

The increase of the revenue has enabled the Society to make an additional appropriation of fifteen hundred dollars for prizes for the coming year, that the committees may more fully carry out the intentions of the founders of the Society.

GEORGE W. FOWLE,
Treasurer.

Boston, Feb. 7, 1885.

Dr. *Massachusetts Horticultural Society, in account with the Proprietors of the Cemetery of Mt. Auburn.* **Cr.**

For Sales and Improvements within the Cemetery for the year ending December 31, 1884.

To cost of filling up and improving land at Mt. Auburn, for the year ending December 31, 1884; the Massachusetts Horticultural Society being charged with their proportion of the same: —		By Sales in January,	$75 00
		" " " February,	1,585 00
		" " " March,	195 00
		" " " April,	972 00
		" " " May,	3,710 75
		" " " June,	3,227 33
		" " " July,	1,537 50
		" " " August,	685 00
		" " " September,	1,519 25
		" " " October,	3,536 62
		" " " November,	1,237 50
		" " " December,	1,549 75
Ivy Path,	$238 00	Net amount of receipts from Receiving Tomb,	631 00
Stone Farm,	1,640 62		$20,461 70
Chant Lot,	3,064 25	Less graves repurchased,	30 00
	$4,942 87		$20,431 70
		Deduct for Annual Expenses,	1,400 00
			$19,031 70
One-quarter of $4,942.87 is,	$1,235 72		
Balance due Massachusetts Horticultural Society,	3,522 20		
	$4,757 92	Mass. Horticultural Society's one-quarter part of $19,031.70 is,	$4,757 92

E. & O. E.

December 31, 1884.

H. B. MACKINTOSH, *Treasurer.*

MASSACHUSETTS HORTICULTURAL SOCIETY,

To the PROPRIETORS OF THE CEMETERY OF MOUNT AUBURN, *Dr.*

For one-fourth part of the following expenditures for grading new lands for sale during the year 1884: —

Ivy Path.		
119 days, men,	$238 00	
		$238 00
Stone Farm.		
Eagle and Birch Avenues: —		
484½ days, men,	$969 50	
191½ " man and horse,	671 12	
		1,640 62
Chant Lot.		
Vesper Avenue: —		
686 days, men,	$1,372 00	
483½ " man and horse,	1,692 00	
		3,064 25
		$4,942 87
One-fourth part of $4,942.87 is,		$1,235 72

J. W. LOVERING,
Superintendent.

MOUNT AUBURN, Dec. 31, 1884.

I certify the foregoing to be a true copy of improvements for the year 1884, rendered by the Superintendent.

H. B. MACKINTOSH,
Treasurer.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1885.

President.

JOHN B. MOORE, of Concord.

Vice-Presidents.

JOHN CUMMINGS, of Woburn.
BENJAMIN G. SMITH, of Cambridge.
CHARLES H. B. BRECK, of Boston.
GEORGE S. HARWOOD, of Newton.

Treasurer and Superintendent of the Building.

GEORGE W. FOWLE, of Boston.

Secretary and Librarian.

ROBERT MANNING, of Salem.*

Recording Secretary.

ROBERT MANNING, of Salem.

Profesor of Botany and Vegetable Physiology.

JOHN ROBINSON, of Salem.

Professor of Entomology.

SAMUEL H. SCUDDER, of Cambridge.

Standing Committees.

Executive.

THE PRESIDENT, JOHN B. MOORE, CHAIRMAN.
THE EX-PRESIDENTS, MARSHALL P. WILDER, CHARLES M. HOVEY, JAMES F. C. HYDE, WILLIAM C. STRONG, FRANCIS PARKMAN, WILLIAM GRAY, JR.; CHAIRMAN OF FINANCE COMMITTEE, H. H. HUNNEWELL; F. L. AMES, CHARLES H. B. BRECK, JOHN C. HOVEY, HENRY P. WALCOTT.

* Communications for the Secretary, on the business of the Society, should be addressed to him, at Horticultural Hall, Boston.

Finance.

H. HOLLIS HUNNEWELL, CHAIRMAN.

JOHN B. MOORE. F. L. AMES.

Publication and Discussion.

O. B. HADWEN, CHAIRMAN.

FRANCIS H. APPLETON. WILLIAM H. HUNT.

Establishing Prizes.

CHAIRMAN OF COMMITTEE ON FRUITS, CHAIRMAN.

CHAIRMEN OF COMMITTEES ON FLOWERS, VEGETABLES, AND GARDENS, *EX OFFICIIS;* C. M. ATKINSON, P. BROWN HOVEY, O. B. HADWEN.

Library.

WILLIAM E. ENDICOTT, CHAIRMAN.

THE PROFESSOR OF BOTANY AND VEGETABLE PHYSIOLOGY AND THE PROFESSOR OF ENTOMOLOGY, *EX OFFICIIS;*

HENRY P. WALCOTT. FRANCIS H. APPLETON

J. D. W. FRENCH. E. P. RICHARDSON.

Gardens.

JOHN G. BARKER, CHAIRMAN.

CHAIRMEN OF COMMITTEES ON FRUITS, FLOWERS, AND VEGETABLES, *EX OFFICIIS;*

CHARLES W. ROSS, BENJAMIN G. SMITH, HENRY W. WILSON.

Fruit.

E. W. WOOD, CHAIRMAN.

P. BROWN HOVEY.	CHARLES F. CURTIS.	O. B. HADWEN.
BENJAMIN G. SMITH.	J. W. MANNING.	WARREN FENNO.

Plants and Flowers.

EDWARD L. BEARD, CHAIRMAN.

PATRICK NORTON.	JAMES CARTWRIGHT.	J. H. WOODFORD.
F. L. HARRIS.	DAVID ALLAN.	EDWIN FEWKES.

Vegetables.

CHARLES N. BRACKETT, CHAIRMAN.

JOSIAH CROSBY.	GEORGE W. PIERCE.	WARREN HEUSTIS.
SAMUEL HARTWELL.	CEPHAS H. BRACKETT.	GEORGE HILL.

Committee of Arrangements.

EDWARD L. BEARD, CHAIRMAN.

CHAIRMEN OF COMMITTEES ON FRUITS, FLOWERS, VEGETABLES, AND GARDENS, *EX OFFICIIS;*

JOHN C. HOVEY.	C. M. ATKINSON.	JAMES COMLEY.
CHARLES F. CURTIS.	JOSEPH H. WOODFORD.	WARREN HEUSTIS.
NATHANIEL T. KIDDER.	CHARLES L. FOWLE.	

MEMBERS FOR LIFE.

Change of residence, or any inaccuracies, should be promptly reported to the Secretary.

Adams, George E.,	Medford.
Albro, Charles,	Taunton.
Alger, R. F.,	Becket.
Allan, David,	Mount Auburn.
Ames, Frank M.,	Canton.
Ames, Frederick L.,	North Easton.
Ames, George,	Boston.
Ames, P. Adams,	Hingham.
Amory, Charles,	Boston.
Amory, Frederick,	Brookline.
Amory, James S.,	Boston.
Anderson, Alex.,	Hingham.
Andrews, Chas. L.,	Swampscott.
Andrews, Frank W.,	Boston.
Andros, Milton,	Brookline.
Appleton, Edward,	Reading.
Appleton, F. H.,	Peabody.
Appleton, Wm. S.,	Boston.
Atkins, Elisha,	Belmont.
Avery, Edward,	Boston.
Ayer, Adams,	"
Ayling, Isaac,	"
Bacon, George,	Brookline.
Bailey, Edwin C.,	Concord, N. H.
Baker, William E.,	Boston.
Bancroft, John C.,	Milton.
Banfield, Francis L.,	Boston.
Barnard, James M.,	"
Barnard, Robert M.,	Everett.
Barnes, Walter S.,	Somerville.
Barnes, William H.,	Boston.
Barney, Levi C.,	"
Barratt, James,	Cambridgeport.
Barrett, Edwin S.,	Concord.
Barrows, Thomas,	Dedham.
Bartlett, Edmund,	Newburyport.
Bates, Amos,	Hingham.
Bates, Caleb,	Kingston.
Bayley, John P.,	Boston.
Beal, Alexander,	Dorchester.
Beckford, D. R., Jr.,	Dedham.
Bell, Joseph H.,	Quincy.
Bemis, Emery,	Grantville.
Berry, James,	Brookline.
Bickford, Weare D.,	Allston.
Birchard, Charles,	Framingham.
Black, James W.,	Boston.
Blagg, Samuel,	Newbern, N. C.
Blakemore, John E.,	Roslindale.
Blanchard, J. W.,	Boston.
Blaney, Henry,	Brookline.
Blinn, Richard D.,	Chicago, Ill.
Bliss, William,	Springfield.
Bocher, Ferdinand,	Boston.
Bochus, Charles E.,	Dorchester.
Bond, George W.,	Boston.
Borland, John N.,	New London, Ct.
Botume, John,	Stoneham.
Bouvé, Thomas T.,	Boston.
Bowditch, Azell C.,	Somerville.
Bowditch, J. I.,	Boston.
Bowditch, Wm. E.,	"
Bowker, William H.,	"
Brackett, C. H.,	Brighton.
Brackett, Chas. N.,	Newton.
Bradish, Levi J.,	Boston.
Bragg, S. A. B.,	Mattapan.
Breed, Henry A.,	Lynn.
Bresee, Albert,	Hubbardton, Vt.
Brewer, John Reed,	Boston.
Brewer, Otis,	"
Brigham, Wm. T.,	"
Brimmer, Martin,	"

Brintnall, Benjamin, Boston.
Brooks, Francis, Medford.
Brown, Alfred S., Jamaica Plain.
Brown, Charles E., Yarmouth, N. S.
Brown, Edward J., Brookline.
Brown, G. Barnard, Boston.
Brown, George B., Framingham.
Brown, Jacob, Woburn.
Brownell, E. S., Essex Junc., Vt.
Bruce, Nathaniel F., Stoneham.
Bullard, John R., Dedham.
Bullard, Wm. S., Boston.
Burnett, Joseph, Southborough.
Burnham, T. O. H. P., Boston.
Burr, Fearing, Hingham.
Burr, Matthew H., "
Buswell, Edwin W., New York, N. Y.
Buswell, Frank E., " " "
Butler, Aaron, Wakefield.
Butler, Edward K., Jamaica Plain.
Butterfield, Wm. P., Arlington.

Cadness, John, Flushing, N. Y.
Cains, William, South Boston.
Calder, Augustus P., Boston.
Capen, John, "
Carlton, Samuel A., Somerville.
Carruth, Charles, Boston.
Carruth, Nathan, Dorchester.
Carter, Miss Sabra, Wilmington.
Chadbourne, M. W., Watertown.
Chamberlain, C. W., Arlington.
Chapin, N. G., Brookline.
Chapman, Edward, Arlington.
Chase, A. J., Lynn.
Chase, Daniel E., Somerville.
Chase, Hezekiah S., Boston.
Chase, William M., Baltimore, Md.
Cheney, Benj. P., Boston.
Child, Francis J., Cambridge.
Child, William C., Medford.
Childs, Francis, Charlestown.
Childs, N. R. Dorchester.
Choate, Charles F., Cambridge.
Claflin, Henry, Brighton.
Claflin, William, Newton.
Clapp, Edward B., Dorchester.
Clapp, E. W., Walpole.
Clapp, James H., Dorchester.
Clapp, William C., "
Clark, B. C., Boston.
Clark, Orus, Worcester.
Clark, William S., Amherst.
Clark, W. L., Neponset.
Clarke, Miss C. H., Jamaica Plain.
Clay, Henry, Dorchester.
Cleary, Lawrence, West Roxbury.
Clement, Asa, Dracut.
Cleveland, Ira, Dedham.
Cobb, Albert A., Brookline.
Coburn, Isaac E., Everett.
Codman, James M., Brookline.
Codman, Ogden, Lincoln.
Coffin, G. Winthrop, West Roxbury.
Coffin, William E. Boston.
Converse, E. S. Malden.
Converse, P. L., Woburn.
Coolidge, Joshua, Watertown.
Copeland, Franklin, West Dedham.
Cox, George P., Malden.
Coy, Samuel I., Boston.
Crocker, George O., New Bedford.
Crocker, Uriel, Boston.
Crosby, Josiah, Arlington.
Crowell, Philander, Chelsea.
Crowell, Randall H., "
Cummings, John, Woburn.
Curtis, Charles F., Jamaica Plain.
Curtis, George S., " "
Cushing, Robert M., Boston.

Daggett, Henry C., Boston.
Damon, Samuel G., Arlington.
Dana, Charles B., Brookline.
Darling, Charles K., Boston.
Davenport, Edward, Dorchester.
Davenport, Geo. E., Boston.
Davenport, Henry, "
Davis, Curtis, Cambridge.
Davis, Hervey, Cambridgeport.
Dawson, Jackson, Jamaica Plain.
Deblois, Stephen G., Boston.
Dee, Thomas W., Mount Auburn.
Denny, Clarence H., Boston.

Denny, R. S., Dorchester.
Denton, Eben, Braintree.
Dewson, Francis A., Boston.
Dexter, F. Gordon, "
Dickerman, Geo. H., Somerville.
Dickinson, Alex., Cambridgeport.
Dike, Charles C., Stoneham.
Dinsmore, Wm. B., New York, N.Y.
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Dorr, George, Dorchester.
Dove, Geo. W.W., Andover.
Durant, William, Boston.
Durfee, Mrs. F. B., Fall River.
Durfee, George B., " "
Dutcher, F. J., Hopedale.
D'Wolf, John L., Boston.

Eaton, Horace, Quincy.
Eldridge, Azariah, Yarmouthport.
Eldridge, E. H., Boston.
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Endicott, Wm. E., Canton.
Eustis, William C., Hyde Park.
Everett, George, Concord.
Everett, Otis, Boston.
Everett, William, "

Fairchild, Charles, Belmont.
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Fisher, James, Boston.
Fisher, Warren, "
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Fletcher, J. Henry, Belmont.
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French, J. D. W., "
Fuller, Henry Weld, "

Galvin, John, West Roxbury.
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Gardner, John L., Brookline.
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Gillard, William, Boston.
Gilson, F. Howard, Reading.
Glover, Albert, Boston.
Glover, Joseph B., "
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Goddard, Mrs. M. T., Newton.
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Gould, Samuel, Boston.
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Grinnell, Joseph, New Bedford.
Groom, Thomas, Dorchester.
Grundel, Hermann, "
Guild, J. Anson, Brookline.

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Hall, George R., Ft. George, Fla.
Hall, John R., Boston.
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Hall, Stephen A., Revere.
Hall, William F., Brookline.
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Hammond, Samuel, "
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Harding, Geo. W., Dorchester.
Harding, Lewis B., Boston.
Harding, W. C., "

Hardy, F. D., Jr., Cambridgeport.
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Hastings, Levi W., Brookline.
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Hilton, William, Boston.
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Hooper, Thomas, Bridgewater.
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Hovey, Charles M., "
Hovey, John C., "
Hovey, P. Brown, "
Hovey, Stillman S., Woburn.
Howe, George, Boston.
Howland, John, Jr., New Bedford.
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Hubbard, G. G., Cambridge.
Hubbard, J. C., Boston.
Hubbard, Wm. J., "
Huckins, J. W., "
Humphrey, F. J., Dorchester.
Humphrey, G. W., Dedham.
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Hunnewell, H. H., "
Hunnewell, Walter, "
Hunt, Franklin, Boston.
Hunt, Moses, "
Hunt, William H., Concord.
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Jackson, Abraham, Boston.
Jackson, Robert T., Dorchester.
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Jeffries, John, Jr., Boston.
Jenks, Charles W., "
Joyce, Mrs. E. S., Medford.

Kakas, Edward, Medford.
Kendall, D. S., Woodstock, Ont.
Kendall, Edward, Cambridgeport.
Kendall, Joseph R., Oakland, Cal.
Kendrick, Mrs. H.P., Allston.
Kennard, Chas. W., Boston.
Kennedy, George G., "
Kent, John, Charlestown.
Keyes, E. W., Denver, Col.
Keyes, George, Concord.
Kidder, Henry P., Boston.
Kidder, Nathaniel T., "
Kimball, A. P., "
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Kingman, C. D., Middleborough.
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Lawrence, Edward, Charlestown.
Lawrence, James, Groton.
Lawrence, John, Boston.
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Leeson, Joseph R., Newton Centre.
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Loring, Caleb W., Boston.
Loring, George B., Salem.
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Low, Ariel, "
Lowder, John, Watertown.
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Lumb, William, Boston.
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Lyman, Theodore, Brookline.
Lyon, Henry, Charlestown.

Mahoney, John, Boston.
Mann, James F., Cambridge.
Mann, Jonathan, "
Manning, Jacob W., Reading.
Manning, Mrs. L. B., Reading.
Manning, Robert, Salem.
Manning, W. H., Reading.
Marshall, Fred'k, Everett.
Martin, Darius A., Chelsea.
Martin, John S., Boston.
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McClure, John, Revere.
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Merriam, M. H., Lexington.
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Minton, James, Dorchester.
Mixter, Charles, Boston.
Moore, John B., Concord.
Moore, John H., "
Morrill, Joseph, Jr., Boston.
Morse, Samuel F., "
Morse, Sidney B., "
Morse, William A., "
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Newhall, George, Dorchester.
Newman, J. R., Winchester.
Newton, Rev. W. W., Boston.
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Norton, Charles W., Allston.
Nourse, Benj. F., Boston.
Nourse, Benj. F., Cambridgeport.

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Otis, Theodore C., "
Oxnard, George D., "

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Paine, Robert T., "
Parker, Augustus, "
Parker, Mrs. M., Wakefield.
Parkman, Francis, Jamaica Plain.
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Pierce, Henry L., Dorchester.
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Poole, Benjamin C., Chelsea.
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Pratt, Robert M., Boston.
Pratt, William, Winchester.

Pray, Mark W., Malden.
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Prescott, Eben C., Boston.
Prescott, W. G., "
Prescott, Wm. G., Quincy.
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Rand, Oliver J., Cambridgeport.
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Ray, Joseph G., "
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Richards, Wm. B., "
Richardson, C. E., Cambridge.
Richardson, Geo. C., "
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Ross, M. Denman, Boston.
Ross, Waldo O., "
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Russell, John E., Leicester.
Russell, Walter, Arlington.

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Sanborn, Amos C., Cambridgeport.
Sanford, O. S., Hyde Park.
Sargent, Charles S., Brookline.
Saville, Richard L., "
Sawtelle, Eli A., Boston.
Sawyer, Timothy T., Charlestown.
Scott, Charles, Newton.
Scudder, C. W., Brookline.
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Seaver, Robert, Jamaica Plain.
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Smith, Charles H., Jamaica Plain.
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Smith, George O., Boston.
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Smith, W. B., Boston.
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Snow, Miss S. H., Brunswick, Me.
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Spaulding, M. D., Boston.
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Spencer, Alfred M., Dorchester.
Springall, George, Malden.
Springer, John, Sterling.
Stetson, Nahum, Bridgewater.
Stickney, Rufus B., Somerville.
Stimpson, George, New York, N.Y.
Stimpson, H. H., Cambridge.
Stone, Amos, Everett.
Stone, George F., Newton.
Stone, Phineas J., Charlestown.
Story, E. Augustus, Brighton.
Strong, William C., NewtonHighl'ds.
Sturgis, John H., Boston.
Sturgis, Russell, Jr., "
Sturtevant, E. Lewis, Geneva, N. Y.
Sumner, Edward, Dedham.
Surette, Louis A., Concord.
Swain, Charles D., Roxbury.

Taft, John B., Boston.
Tappan, Charles, "

Taylor, Horace B., Boston.
Thacher, Alfred C., Dorchester.
Thayer, Henry, No. Cambridge.
Thayer, Nathaniel, Boston.
Thurlow, Thos. C., Newburyport.
Tidd, Marshall M., Woburn.
Tilton, Stephen W., Boston.
Todd, John, Hingham.
Tolman, Benjamin, Concord.
Tolman, Miss H. S., Boston.
Torrey, Everett, Charlestown.
Turner, John M., Dorchester.
Turner, Roswell W., Boston.
Turner, Royal W., Randolph.

Underwood, Guy C., Boston.
Underwood, Wm. J., Belmont.
Upham, Henry, Brookline.

Vass, William J., Brookline.
Vose, Benjamin C., Hyde Park.

Wainwright, Wm. L., Braintree.
Wakefield, E. H., Chelsea.
Walcott, Edward, Pawtucket.
Walcott, Henry P., Cambridge.
Wales, George O., Braintree.
Walker, Edw. C. R., Dedham.
Walker, Samuel A., "
Walker, T. W., Waltham.
Walley, Mrs. W. P., Boston.
Ward, John, Newton.
Wardwell, W. H., Newton Centre.
Ware, Benjamin P., Beach Bluff.
Warren, George W., Boston.
Washburn, Andrew, Hyde Park.
Wason, Elbridge, Brookline.
Waters, Edwin F., Newton Centre.
Waters, George F., Boston.
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Watts, Isaac, Newton.
Webber, Aaron D., Belmont.
Weld, Aaron D., Boston.
Weld, George W., Newport, R. I.
Weld, Dr. Moses W., West Roxbury.
Weld, Richard H., Boston.
Weld, William G., "
West, Mrs. Maria L., Brookline.
Weston, Leonard W., Lincoln.
Weston, Seth, Revere.
Wetherell, Leander, Boston.
Wheelwright, A. C., Boston.
Whipple, John A., "
Whitcomb, Wm. B., Medford.
White, Benjamin C., Boston.
White, Edward A., "
White, Francis A., Brookline.
Whitely, Edward, Cambridge.
Whiting, Nathaniel, Brookline.
Whitmore, C. O., Boston.
Whittle, Geo. W., Somerville.
Whytal, Thos. G., New York, N.Y.
Wilbur, G. B., Watertown.
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Wilder, Edw. Baker, Dorchester.
Wilder, Henry A., Boston.
Wilder, Marshall P., Dorchester.
Willard, E. W., Newport, R.I.
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Williams, Benj. B., "
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Willis, George W., Chelsea.
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Wilson, Henry W., Boston.
Wilson, Wm. Power, "
Woerd, Charles V., Waltham.
Woerd, C. V., Jr., "
Wood, Luke H., Marlborough.
Wood, R. W., Jamaica Plain.
Wood, William K., West Newton.
Woods, Henry, Dorchester.
Woodward, Royal, Brookline.
Wright, George C., West Acton.
Wrisley, Frank, New York, N.Y.

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Anderson, Chas, J., Longwood.
Atkinson, Chas. M., Brookline.
Atkinson, Edward, "
Atkinson, W. B., Newburyport.

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Bacon, William, "
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Beer, Carl, Groton.
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Bolton, John B., Somerville.
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Breck, Chas. H.B., "
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Curtis, Joseph H., "

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Davis, Thomas M., Cambridgeport.
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Duffley, Daniel, Brookline.
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Fenno, Warren, Revere.
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Fletcher, Edwin, Acton.
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Frost, Stiles, Boston.
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Gilbert, W. A., Neponset.
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Gray, William, 3d, "
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Hersey, Edmund, "
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Hill, Miss Katie A., Lowell.
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Hunt, Henry C., Newton.

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Jameson, G. W., East Lexington.
Jones, Moses, Brookline.
Jordan, Samuel, Yarmouth.
Judkins, Rev. B., West Dedham.

Kelley, George B., Jamaica Plain.
Kelsey, Fred W., Waverly, N.Y.
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Loring, Charles G., Boston.
Loring, John A., "
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Lothrop, H. A., Sharon.
Lothrop, T. K., Boston.
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Manda, William A., Cambridge.
Marcou, Mrs. J., "
Markoe, G. F. H., Boston.

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McIntosh, A. S., "
McLaren, Anthony, Forest Hills.
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Merrill, J. Warren, Cambridgeport.
Merrill, S. A., Wollaston.
Meston, Alexander, Andover.
Mills, William, Somerville.
Minton, Peter J., Forest Hills,
Morandi, Francis, Malden.
Morandi, Francis W., "
Morton, James H., Boston.
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Muzzey, Rev. A. B., Cambridge.

Nelson, Mrs. T. L., Worcester.
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Norton, Michael H., Boston.
Norton, Patrick, "

O'Brien, James, Jamaica Plain.

Paige, Clifton H., Mattapan.
Park, William D., Boston.
Parker, John, "
Parsons, William, "
Patterson, James, Cambridge.
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Richardson, E. P., Lawrence.
Richardson, Horace, Framingham.
Richardson, S. W., Boston.
Ridler, Charles E., Boston.
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Robinson, William, North Easton.
Rogers, John F., Cambridge.
Ross, Charles W., Newtonville.

Safford, Nath. F., Milton.
Saunders, Miss M. T., Salem.
Saville, George, Quincy.
Sawtell, J. M., Fitchburg.
Schmitt, George A., Wellesley.
Scott, A. E., Lexington.
Scott, George H., Allston.
Scudder, Samuel H., Cambridge.
Shattuck, F. R., Boston.
Shedd, Abraham B., Lexington.
Shedd, Arthur B., Chicago, Ill.
Sheppard, Edwin, Lowell.
Sheppard, S. A. D., Newton.
Snow, Eugene A., Melrose.
Southworth, Edw., Quincy.
Spooner, Wm. H., Jamaica Plain.
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Trautman, Martin, "
Turner, Nathaniel W., "

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Walker, Wm. P., Somerville.
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Weld, Francis M., " "
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White, Nelson B., Norwood.
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Whiton, Starkes, HinghamCentre.
Wilde, Hiram, Randolph.
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Wilson, George W., Malden.
Wiswall, Henry M., Watertown.
Withington, H. H., Jamaica Plain.
Wolcott, Mrs. H. L. T., Boston.
Wood, Mrs. A. D., West Newton.
Wood, E. W., " "
Woodford, Jos. H., Newton.
Woolson, Geo. C., Passaic, N. J.
Worthington, R., Boston.
Wright, Daniel, Lowell.

Zirngiebel, Denys, Needham.

EXTRACTS FROM THE CONSTITUTION AND BY-LAWS.

SECTION XXVI. — Life Members.

The payment of thirty dollars shall constitute a Life Membership, and exempt the member from all future assessments; and any member having once paid an admission fee may become a Life Member by the payment of twenty dollars in addition thereto.

SECTION XXVII. — Admission Fee and Annual Assessment.

Every subscription member, before he receives his diploma, or exercises the privileges of a member, shall pay the sum of ten dollars as an admission fee, and shall be subject afterwards to an annual assessment of two dollars.

SECTION XXIX. — Discontinuance of Membership.

Any member who shall neglect for the space of two years to pay his annual assessment shall cease to be a member of the Society, and the Treasurer shall erase his name from the List of Members.

The attention of Annual Members is particularly called to Section XXIX.

HONORARY MEMBERS.

A * denotes the member deceased. Correspondents of the Society and others will confer a favor by communicating to the Secretary information of the decease, change of residence, etc., of Honorary or Corresponding Members.

*Benjamin Abbott, LL.D., Exeter, N. H.
*John Abbott, Brunswick, Me.
*Hon. John Quincy Adams, LL.D., late President of the United States, Quincy.
*Professor Louis Agassiz, Cambridge.
*William T. Aiton, late Curator of the Royal Gardens, Kew, England.
*Thomas Allen, late President of the St. Louis Horticultural Society, St. Louis, Mo., and Pittsfield, Mass.
*Hon. Samuel Appleton, Boston.
*Hon. James Arnold, New Bedford.
*Edward Nathaniel Bancroft, M.D., late President of the Horticultural and Agricultural Society of Jamaica.
*Hon. Philip P. Barbour, Virginia.
*Don Angel Calderon de la Barca, late Spanish Minister at Washington.
*Robert Barclay, Bury Hill, Dorking, Surrey, England.
*James Beekman, New York.
*L'Abbe Berlèse, Paris.
*Nicholas Biddle, Philadelphia.
*Dr. Jacob Bigelow, Boston.
*Mrs. Lucy Bigelow, Medford.
*Le Chevalier Soulange Bodin, late Secrétaire Général de la Société d'Horticulture de Paris.
Hon. George S. Boutwell, Groton.
*Josiah Bradlee, Boston.
*Hon. George N. Briggs, Pittsfield.
*Hon. James Buchanan, late President of the United States, Lancaster, Penn.
*Jesse Buel, late President of the Albany Horticultural Society, Albany, N. Y.
*Hon. Edmund Burke, late Commissioner of Patents, Washington, D. C.
*Augustin Pyramus de Candolle, Geneva, Switzerland.
Hon. Horace Capron, ex-U. S. Commissioner of Agriculture, Washington, D. C.
*Commodore Isaac Chauncey, U. S. Navy, Brooklyn, N. Y.
*Ward Chipman, late Chief-Justice of New Brunswick, St. John.

*Lewis Clapier, Philadelphia.
*Hon. Henry Clay, Lexington, Ky.
H. W. S. Cleveland, Chicago, Ill.
*Admiral Sir Isaac Coffin, Bart., England.
*Zaccheus Collins, late President of the Pennsylvania Horticultural Society, Philadelphia.
*Roswell L. Colt, Paterson, N. J.
Caleb Cope, ex-President of the Pennsylvania Horticultural Society, Philadelphia.
*William Coxe, Burlington, N. J.
*John P. Cushing, Watertown.
*Charles W. Dabney, late U. S. Consul, Fayal, Azores.
*Hon. John Davis, LL.D., Boston.
*Sir Humphry Davy, London.
*Gen. Henry Alexander Scammel Dearborn, Roxbury.
*James Dickson, late Vice-President of the Horticultural Society of London.
*Mrs. Dorothy Dix, Boston.
*Capt. Jesse D. Elliot, U. S. Navy.
*Hon. Stephen Elliot, LL.D., Charleston, S. C.
*Hon. Henry L. Ellsworth, late Commissioner of Patents, Washington, D. C.
*Allyn Charles Evanson, late Secretary of the King's County Agricultural Society, St. John, N. B.
*Hon. Edward Everett, LL.D., Boston.
*Hon. Horace Everett, Vermont.
*F. Faldermann, late Curator of the Imperial Botanic Garden, St. Petersburg.
*Hon. Millard Fillmore, late President of the United States, Buffalo, N.Y.
*Dr. F. E. Fischer, late Professor of Botany at the Imperial Botanic Garden, St. Petersburg.
*Hon. Theodore Frelinghuysen, late President of the American Agricultural Society, New Brunswick, New Jersey.
*Joseph Gales, Jr., late Vice-President of the Horticultural Society, Washington, D. C.
*George Gibbs, New York.
*Stephen Girard, Philadelphia.
*Hon. Robert T. Goldsborough, Talbot County, Maryland.
*Ephraim Goodale, South Orrington, Maine.
*Mrs. Rebecca Gore, Waltham.
*Hon. John Greig, late President of the Domestic Horticultural Society, Canandaigua, N. Y.
*Mrs. Mary Griffith, Charlies Hope, N. J.
*Gen. William Henry Harrison, late President of the United States, North Bend, Ohio.
*S. P. Hildreth, M.D., Marietta, Ohio.
*Thomas Hopkirk, late President of the Glasgow Horticultural Society.
*David Hosack, M.D., late President of the New York Horticultural Society.
*Lewis Hunt, Huntsburg, Ohio.

*Joseph R. Ingersoll, late President of the Pennsylvania Horticultural Society, Philadelphia.
*Gen. Andrew Jackson, late President of the United States, Nashville, Tenn.
*Mrs. Martha Johonnot, Salem.
*Jared Potter Kirtland, M.D., LL.D., East Rockport, Ohio.
*Thomas Andrew Knight, late President of the Horticultural Society of London.
*Gen. La Fayette, La Grange, France.
*Le Comte De Lasteyrie, late Vice-President of the Horticultural Society of Paris.
L. A. H. Latour, M. P., Montreal, Canada.
*Baron Justus Leibig, Giessen, Germany.
*Prof. John Lindley, late Secretary of the Horticultural Society of London.
*Franklin Litchfield, late U. S. Consul at Puerto Cabello, Venezuela.
*Joshua Longstreth, Philadelphia.
*Nicholas Longworth, Cincinnati, Ohio.
*Jacob Lorillard, late President of the New York Horticultural Society.
*John C. Loudon, London.
*Hon. John A. Lowell, Boston.
*Baron Charles Ferdinand Henry Von Ludwig, late Vice-President of the South African Literary and Scientific Institution, Cape Town, Cape of Good Hope.
*Hon. Theodore Lyman, Brookline,
Col. Theodore Lyman, Brookline.
*Hon. James Madison, late President of the United States, Montpelier, Va.
*Mrs. Charlotte Marryatt, Wimbledon, near London.
Joseph Maxwell, Rio Janeiro.
*D. Smith McCauley, late U. S. Consul-General, Tripoli.
*Hon. Isaac McKim, late President of the Horticultural Society of Mary land, Baltimore.
Rev. James H. Means, Dorchester, Mass.
*James Mease, M.D., Philadelphia.
*Lewis John Mentens, Brussels, Belgium.
*Hon. Charles F. Mercer, Virginia.
*François André Michaux, Paris.
Donald G. Mitchell, New Haven, Conn.
*Samuel L. Mitchill, M.D., LL.D., New York.
*Hon. James Monroe, late President of the United States, Oak Hill, Va.
*Alfred S. Monson, M.D., late President of the New Haven Horticultural Society, New Haven, Conn.
*Hon. A. N. Morin, Montreal, Canada.
*Théodore Mosselmann, Antwerp, Belgium.
Baron R. Von Osten Sacken, Heidelberg, Germany.
*Baron Ottenfels, late Austrian Minister to the Ottoman Porte.
*John Palmer, Calcutta.
*Hon Joel Parker, LL.D., Cambridge.
Samuel B. Parsons, Flushing, N. Y.

*Hon. Thomas H. Perkins, Brookline.
*A. Poiteau, late Professor in the Institut Horticole de Fromont.
*Hon. James K. Polk, late President of the United States, Nashville, Tenn.
*John Hare Powel, Powelton, Pa.
*Henry Pratt, Philadelphia.
*William Prince, Flushing, N. Y.
*Rev. George Putnam, D.D., Roxbury.
*Col. Joel Rathbone, late President of the Albany and Rensselaer Horticultural Society, Albany, N. Y.
*Archibald John, Earl of Roseberry, late President of the Caledonian Horticultural Society.
*Joseph Sabine, late Secretary of the Horticultural Society of London.
*Don Ramon de la Sagra, Havana, Cuba.
*Henry Winthrop Sargent, Fishkill, N. Y.
*Sir Walter Scott, Abbotsford, Scotland.
*John Shepherd, late Curator of the Botanic Garden, Liverpool, England.
*John S. Skinner, late Editor of the American Farmer, Baltimore, Md.
George W. Smith, Boston.
*Stephen H. Smith, late President of the Rhode Island Horticultural Society.
*Hon. Charles Sumner, Boston.
*Hon. John Taliaferro, Virginia.
*Gen. James Talmadge, late President of the American Institute, New York.
*Gen. Zachary Taylor, late President of the United States, Baton Rouge, La.
*James Thacher, M.D., Plymouth.
John J. Thomas, Union Springs, N. Y.
*James W. Thompson, M.D., Wilmington, Del.
*Grant Thorburn, New York.
*M. Du Petit Thouars, Paris.
*Le Vicomte Héricart de Thury, late President of the Horticultural Society of Paris.
*Mons. Tougard, late President of the Horticultural Society of Rouen, France.
*Gen. Nathan Towson, late President of the Horticultural Society, Washington, D. C.
*Hon. John Tyler, late President of the United States, Williamsburg, Va.
*Rev. Joseph Tyso, Wallingford, England.
*Hon. Martin Van Buren, late President of the United States, Kinderhook, N. Y.
*Federal Vanderburg, M.D., New York.
*Jean Baptiste Van Mons, M.D., Brussels, Belgium.
*Gen. Stephen Van Rensselaer, Albany, N. Y.
*Joseph R. Van Zandt, Albany, N. Y.
*Benjamin Vaughan, M.D., Hallowell, Me.
*Petty Vaughan, London.
*Rev. N. Villeneuve, Montreal, Canada.
*Pierre Philippe André Vilmorin, Paris.

*James Wadsworth, Geneseo, N. Y.
*Nathaniel Wallich, M.D., late Curator of the Botanic Garden, Calcutta.
*Malthus A. Ward, M.D., late Professor in Franklin College, Athens, Ga.
*Hon. Daniel Webster, Marshfield.
*Hon. John Welles, Boston.
*Jeremiah Wilkinson, Cumberland, R. I.
Hon. Robert C. Winthrop, Boston.
*Frederick Wolcott, Litchfield, Conn.
*Ashton Yates, Liverpool, England.
*Lawrence Young, late President of the Kentucky Horticultural Society, Louisville.

CORRESPONDING MEMBERS.

A * denotes the members deceased.

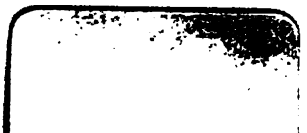
*John Adlum, Georgetown, D. C.
*Don Francisco Aguilar y Leal, late U. S. Vice-Consul at Maldonado, Banda Oriental del Uruguay.
*Mons. Alfroy, Lieusaint, France.
James T. Allan, ex-President of the Nebraska State Horticultural Society, Omaha, Neb.
A. B. Allen, New York.
*Rev. Thomas D. Anderson, D. D., South Boston.
*Thomas Appleton, late U. S. Consul at Leghorn, Italy.
*Col. Thomas Aspinwall, late U. S. Consul at London, Brookline.
P. M. Augur, State Pomologist, Middlefield, Conn.
*Isaac Cox Barnet, late U. S. Consul at Paris.
Patrick Barry, ex-Chairman of the General Fruit Committee of the American Pomological Society, Rochester, N. Y.
*Augustine Baumann, Bolwiller, Alsace.
*Eugéne Achille Baumann, Rahway, N. J.
*Joseph Bernard Baumann, Bolwiller, Alsace.
Napoleon Baumann, Bolwiller, Alsace.
D. W. Beadle, St. Catherine's, Ontario.
Professor W. J. Beal, Lansing, Michigan.
*Noel J. Becar, Brooklyn, N. Y.
*Edward Beck, Worton College, Isleworth, near London.
Rev. Henry Ward Beecher, Peekskill, N. Y.
*Louis Édouard Berckmans, Rome, Ga.
Prosper J. Berckmans, Augusta, Ga.
*Alexander Bivort, late Secretary of the Société Van Mons, Fleurus, Belgium.
*Tripet Le Blanc, Paris.
*Charles D. Bragdon, Pulaski, Oswego Co., N. Y.
*William D. Brinckle, M.D., Philadelphia.
*George Brown, late U. S. Commissioner to the Sandwich Islands, Beverly.
*John W. Brown, Fort Gaines, Ga.
*Dr. Nehemiah Brush, East Florida.
*Arthur Bryant, Sr., late President of the Illinois State Horticultural Society, Princeton, Ill.
*Robert Buist, Philadelphia.
*Dr. E. W. Bull, Hartford, Conn.

WILLIAM BULL, Chelsea, England.
REV. ROBERT BURNET, ex-President of the Ontario Fruit Growers' Association, Picton, N. S.
ALEXANDER BURTON, United States Consul at Cadiz, Spain.
ISIDOR BUSH, Bushberg, Jefferson Co., Mo.
GEORGE W. CAMPBELL, Delaware, Ohio.
*FRANCIS G. CARNES, New York.
*COL. ROBERT CARR, Philadelphia.
*REV. JOHN O. CHOULES, D.D., Newport, R. I.
*REV. HENRY COLMAN, Boston.
*JAMES COLVILL, Chelsea, England.
BENJAMIN E. COTTING, M.D., Boston.
*SAMUEL L. DANA, M.D., Lowell.
*J. DECAISNE, late Professeur de Culture au Muséum d'Histoire Naturelle, Jardin des Plantes, Paris.
*JAMES DEERING, Portland, Me.
*H. F. DICKEHUT.
*SIR C. WENTWORTH DILKE, Bart., London.
*HON. ALLEN W. DODGE, Hamilton.
REV. H. HONYWOOD D'OMBRAIN, Westwell Vicarage, Ashford, Kent, England.
*ANDREW JACKSON DOWNING, Newburg, N. Y.
CHARLES DOWNING, Newburg, N. Y.
PARKER EARLE, Cobden, Ill.
*F. R. ELLIOTT, late Secretary of the American Pomological Society, Cleveland, Ohio.
GEORGE ELLWANGER, Rochester, N. Y.
*GEORGE B. EMERSON, LL.D., Winthrop.
*EBENEZER EMMONS, M.D., Williamstown.
*ANDREW H. ERNST, Cincinnati, O.
*NATHANIEL FELLOWS, Cuba.
*HENRY J. FINN, Newport, R. I.
*W. C. FLAGG, late Secretary of the American Pomological Society, Moro, Ill.
*MICHAEL FLOY, late Vice-President of the New York Horticultural Society, New York City.
*JOHN FOX, Washington, D. C.
*HON. RUSSELL FREEMAN, Sandwich.
ANDREW S. FULLER, Ridgewood, N. J.
HENRY WELD FULLER, Roxbury.
HON. ROBERT W. FURNAS, President of the Nebraska State Horticultural Society, Brownville, Neb.
*AUGUSTIN GANDE, late President of the Horticultural Society, Department of Sarthe, France.
*ROBERT H. GARDINER, Gardiner, Me.
*BENJAMIN GARDNER, late U. S. Consul at Palermo, Sicily.
*CAPT. JAMES T. GERRY, U. S. Navy.
*ABRAHAM P. GIBSON, late U. S. Consul at St. Petersburg.

*R. Glendinning, Chiswick, near London.
Professor George L. Goodale, Cambridge.
*George W. Gordon, late U. S. Consul at Rio Janeiro.
Professor Asa Gray, Cambridge.
O. B. Hadwen, ex-President of the Worcester County Horticultural Society, Worcester.
*Charles Henry Hall, New York.
*Abraham Halsey, late Corresponding Secretary of the New York Horticultural Society, New York.
*Dr. Charles C. Hamilton, late President of the Fruit Growers' Association and International Show Society of Nova Scotia, Canada.
*Rev. Thaddeus Mason Harris, D.D., Dorchester.
*Thaddeus William Harris, M.D., Cambridge.
*John Hay, late Architect of the Caledonian Horticultural Society.
*Bernard Henry, late U. S. Consul at Gibraltar, Philadelphia.
Shirley Hibberd, Editor of the Gardener's Magazine, London.
*J. J. Hitchcock, Baltimore.
Robert Hogg, LL.D., Editor of the Journal of Horticulture, London.
*Thomas Hogg, New York.
Thomas Hogg, New York.
J. C. Holding, ex-Treasurer and Secretary of the Cape of Good Hope Agricultural Society, Cape Town, Africa.
Rev. S. Reynolds Hole, Caunton Manor, Newark, Nottinghamshire, England.
Sir Joseph Hooker, K. C. S. I., Director of the Royal Botanic Garden, Kew, England.
Josiah Hoopes, West Chester, Penn.
Professor E. N. Horsford, Cambridge.
*Sanford Howard, Chicago, Ill.
*Dr. William M. Howsley, late President of the Kansas State Horticultural Society, Leavenworth.
*Isaac Hunter, Baltimore, Md.
*Isaac Hurd, Cincinnati, Ohio.
George Husmann, Napa, Cal.
*Professor Isaac W. Jackson, Union College, Schenectady, N. Y.
*Thomas P. James, Cambridge.
*Edward Jarvis, M.D., Dorchester.
J. W. P. Jenks, Middleborough.
Charles Joly, Paris.
William J. Johnson, M.D., Fort Gaines, Ga.
Samuel Kneeland, M.D., Boston.
*Mons. Laffay, St. Cloud, near Paris, France.
*David Landreth, late Corresponding Secretary of the Pennsylvania Horticultural Society, Bristol, Pa.
C. C. Langdon, Mobile, Alabama.
*Dr. William LeBaron, late State Entomologist, Geneva, Ill.
Max Leichtlin, Baden-Baden, Germany.

G. F. B. LEIGHTON, President of the Norfolk Horticultural and Pomological Society, Norfolk, Va.
VICTOR LEMOINE, Nancy, France.
*E. S. H. LEONARD, M.D., Providence, R. I.
*ANDRÉ LEROY, Author of the Dictionnaire de Pomologie, Angers, France.
J. LINDEN, Ghent, Belgium.
HON. GEORGE LUNT, Scituate.
*F. W. MACONDRAY, San Francisco, Cal.
*JAMES J. MAPES, LL.D., Newark, N. J.
*A. MAS, late President of the Horticultural Society, Bourg-en-Bresse, France.
DR. MAXWELL T. MASTERS, Editor of the Gardeners' Chronicle, London.
*JAMES MAURY, late U. S. Consul at Liverpool, England.
T. C. MAXWELL, Geneva, N. Y.
*WILLIAM SHARP MCLEAY, New York.
*JAMES MCNAB, late Curator of the Botanic Garden, Edinburgh, Scotland.
THOMAS MEEHAN, Editor of the Gardener's Monthly, Germantown, Pa.
*ALLAN MELVILL, New York.
*JOHN MILLER, M.D., late Secretary of the Horticultural and Agricultural Society of Jamaica.
*STEPHEN MILLS, Flushing, N. Y.
*CHARLES M'INTOSH, Dalkeith Palace, near Edinburgh.
JOSEPH E. MITCHELL, Philadelphia.
*GIUSEPPE MONARCHINI, M.D., Canea, Isle of Candia.
ÉDOUARD MORREN, Editor of the Belgique Horticole, Liège, Belgium.
*HORATIO NEWHALL, M.D., Galena, Ill.
*DAVID W. OFFLEY, late U. S. Consular Agent, Smyrna, Turkey.
*JAMES OMBROSI, late U. S. Consul, Florence, Italy.
*JOHN J. PALMER, New York.
*VICTOR PAQUET, Paris.
*JOHN W. PARKER, late U. S. Consul at Amsterdam, Holland.
*ANDRÉ PARMENTIER, Brooklyn, N. Y.
WILLIAM PAUL, Waltham Cross, London, N.
*SIR JOSEPH PAXTON, M. P., Chatsworth, England.
*JOHN L. PAYSON, late U. S. Consul at Messina, Sicily.
*COM. MATTHEW C. PERRY, U. S. Navy, Charlestown.
*DAVID PORTER, late U. S. Chargé d' Affaires at the Ottoman Porte, Constantinople.
*ALFRED STRATTON PRINCE, Flushing, N. Y.
*WILLIAM ROBERT PRINCE, Flushing, N. Y.
P. T. QUINN, Newark, N. J.
*REV. RUSHTON RADCLYFFE, London, England.
*WILLIAM FOSTER REDDING, Baltimore, Md.
D. REDMOND, Ocean Springs, Miss.
DR. EDWARD REGEL, St. Petersburg, Russia.
DR. S. REYNOLDS, Schenectady, N. Y.
*JOHN H. RICHARDS, M.D., Illinois.
CHARLES V. RILEY, Entomologist to the U. S. Department of Agriculture, Washington, D. C.

*Mons. J. Rinz, Jr., Frankfort-on-the-Main, Germany.
*Thomas Rivers, Sawbridgeworth, Herts, England.
William Robinson, Editor of The Garden, London.
*Bernhard Roeser, M.D., Bamberg, Bavaria.
*Dr. J. Smith Rogers, New York.
*Capt. William S. Rogers, U. S. Navy.
*Thomas Rotch, Philadelphia.
*George R. Russell, Roxbury.
John B. Russell, Newmarket, N. J.
*Rev. John Lewis Russell, Salem.
William Saunders, Department of Agriculture, Washington, D. C.
*William Shaler, late U. S. Consul-General at Havana, Cuba.
*William Shaw, New York.
*Caleb R. Smith, Burlington, N. J.
*Daniel D. Smith, Burlington, N. J.
*Gideon B. Smith, late Editor of the American Farmer, Baltimore, Md.
*John Jay Smith, Germantown, Penn.
*Horatio Sprague, late U. S. Consul at Gibraltar.
Robert W. Starr, Port William, Nova Scotia.
Dr. Joseph Stayman, Leavenworth, Kansas.
*Capt. Thomas Holdup Stevens, U. S. Navy, Middletown, Conn.
*William Fox Strangeway, late British Secretary of Legation at Naples, Italy.
Dr. J. Strentzel, Martinez, Cal.
*Judge E. B. Strong, Rochester, N. Y.
*James P. Sturgis, Canton, China.
William Summer, Pomaria, S. C.
Francis Summerest.
*Professor Michele Tenore, late Director of the Botanic Garden at Naples, Italy.
*James Englebert Teschemacher, Boston.
*Robert Thompson, Chiswick, near London.
*George C. Thorburn, New York.
Professor George Thurber, Editor of the American Agriculturist, New York.
*John Tilson, Jr., Edwardsville, Illinois.
*Cav. Doct. Vincenzo Tineo, late Director of the Botanic Garden at Palermo.
*Luther Tucker, late Editor of the Cultivator, Albany, N. Y.
*Carey Tyso, Wallingford, England.
*Louis Van Houtte, Ghent, Belgium.
*Alexander Vattemare, Paris.
*Emilien de Wael, late Secretary of the Horticultural Society, Antwerp, Belgium.
*John A. Warder, M.D., late President of the Ohio State Horticultural Society, North Bend, Ohio.
Anthony Waterer, Knapp Hill, near Woking, Surrey, England.
*J. Ambrose Wight, late Editor of the Prairie Farmer, Chicago, Ill.

BENJAMIN SAMUEL WILLIAMS, Holloway, London, N.
PROFESSOR JOHN WILSON, Edinburgh University, Scotland.
*WILLIAM WILSON, New York.
*HON. J. F. WINGATE, Bath, Me.
*GEN. JOSHUA WINGATE, Portland, Me.
*JOSEPH AUGUSTUS WINTHROP, Charleston, S. C.

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